

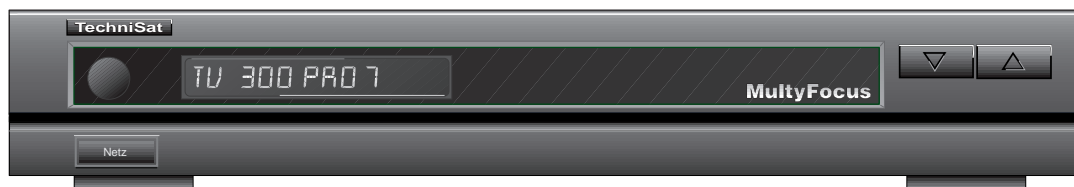
TechniSat®



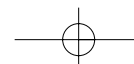
Operating Instructions

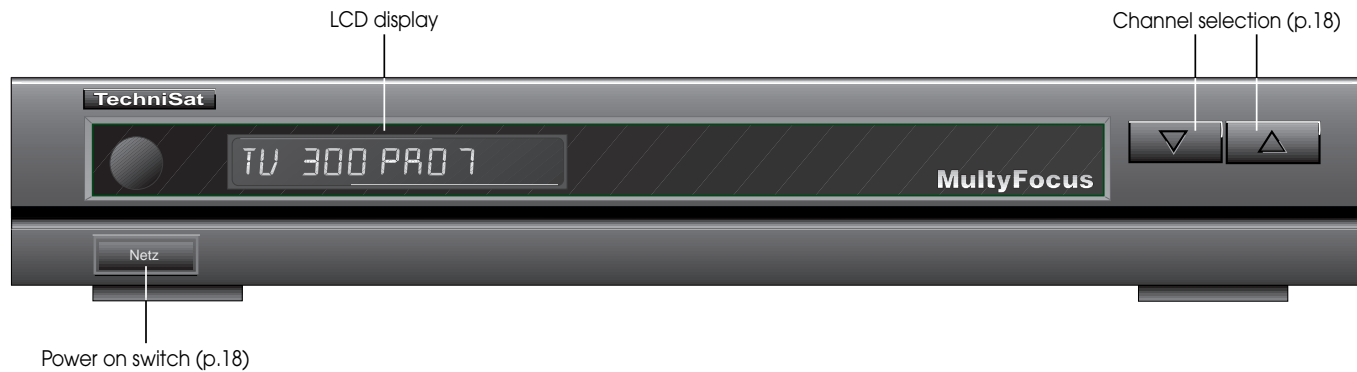
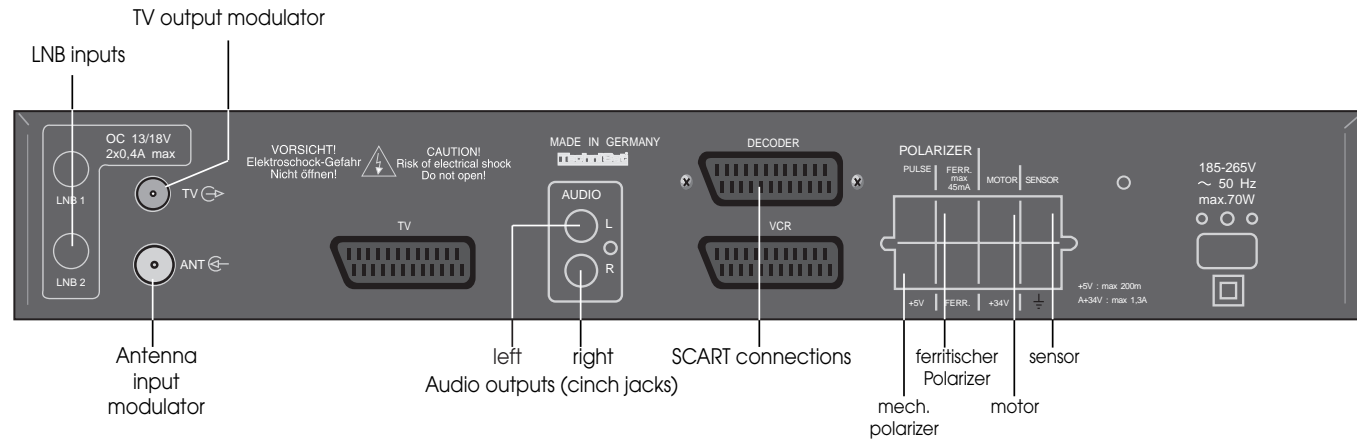
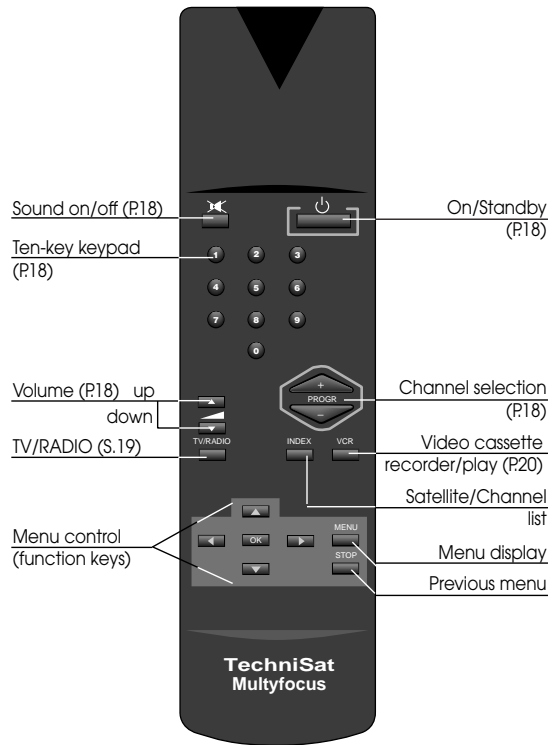
MultyFocus

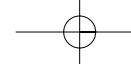
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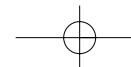
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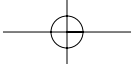
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2 Please read first!

Reading the operation instructions


Chapters 4 and 5 explain how to connect and adapt the receiver to the outdoor unit (reflector, LNB, etc.), the TV set, etc. This set-up is required only once; you only need to make amendments in case the outdoor unit installation has changed or additional equipment has been connected, e.g. decoder.

Chapter 6 describes all functions necessary for every-day use, such as channel selection or volume control.

Chapter 7 will give you information on how you set up new channels and satellites or how you change the channel sort order.

Chapter 8 lists all the pre-programmed channels.

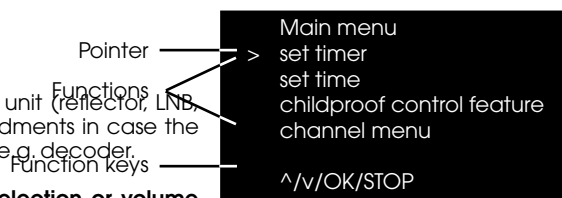
Important notes on device control

Using a so-called „On Screen Display“ simplifies receiver control and reduces the number of s on the remote control. All features are displayed on the TV monitor and can be controlled by little key action.

Related features have been collected to a „MENU“.

A „POINTER“ marks the function you can activate at a time.


Example:

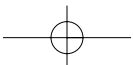


The last menu line always displays the „function keys“.

Use these to:

- move the pointer,
- start a function,
- change values,
- store changes, and
- to quit the menus.

Press the MENU key  to change the background of some menus from coloured display to normal TV screen.



3 Safety precautions

For your own protection, carefully read the safety precautions before starting to use your new device.

The manufacturer is not liable to damage caused by improper handling or by disregarding the safety precautions.

Take care that empty remote control batteries are not put into the household waste but disposed off properly (return to specialist stores, special waste)

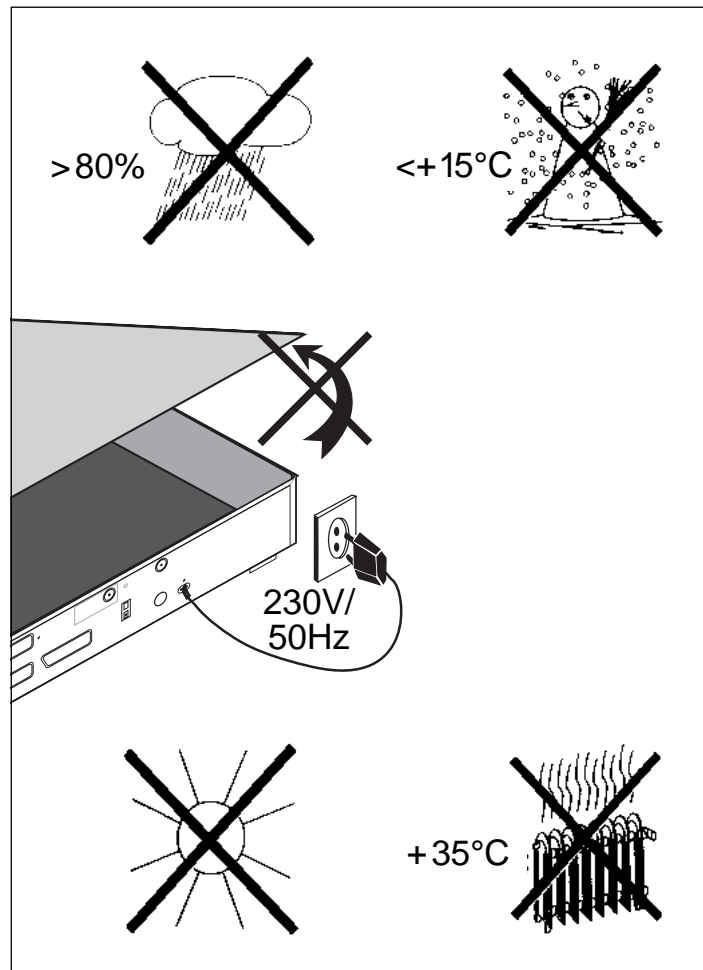
Styrofoam packing harmful to the environment has not been used. The packing which can be recycled corresponds to the requirements of the new packing regulations.

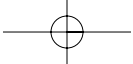
Never open the device. There is danger of an electric shock. Repairs should only be carried out by qualified specialists.

Operational breaks: during a storm or when operation is interrupted for a long time disconnect the device from mains.

In the following cases disconnect the device from mains and ask a specialist for help:

- the power supply cord or the connector are damaged
- the device was exposed to humidity or a liquid has flown into the device
- in case of considerable malfunctions
- in case of considerable external damage.





4 Connections

4.1 Outdoor unit

- a) Use an appropriate coax cable to connect the receiver's input LNB 1 with the receiving equipment's LNB input. You may connect a second LNB to LNB input 2. For further details, see chapter 5, „Installation“.
- b) Connect the ferrite polarizer to the POLARIZER terminals marked FERR. (You can connect mechanical polarizer models to the terminals marked PULSE, +5V and).
- c) Connect the actuator to the terminals marked MOTOR/+34V and the sensor to the terminals SENSOR/



4.2 Television

- d) Connect the receiver to a 230 V/50 Hz wall socket. Press the power on switch and press the remote control key to turn it on. Press the MENU key to set it to standby mode, briefly.
- e) Use a SCART cord to connect the receiver (SCART TV) with the TV (SCART input). If your television does not switch to AV operation (audio/video) automatically, you will need to switch over manually.
- f) If your television set is not equipped with a SCART connector you can also use an antenna cable to connect the output of the modulator with the TV's antenna input. Plug the cable coming from the antenna in the modulator's antenna input.

Netz



Your television set has to be adjusted to the transmission channel of the receiver. Select a free channel on your TV set and adjust it to channel 39. If channel 39 is occupied by a channel that can be received via antenna, you can adjust a different transmission channel in the range of 21 to 45.

- > Press to switch the receiver to standby mode.
- > Press and on the receiver at the same time and hold the key down approx. 2 seconds.

display:

- > Press briefly

display:

Channel no 39

- > Press to select display:

Channel no 39

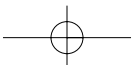
- > Set your TV to the same channel

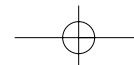
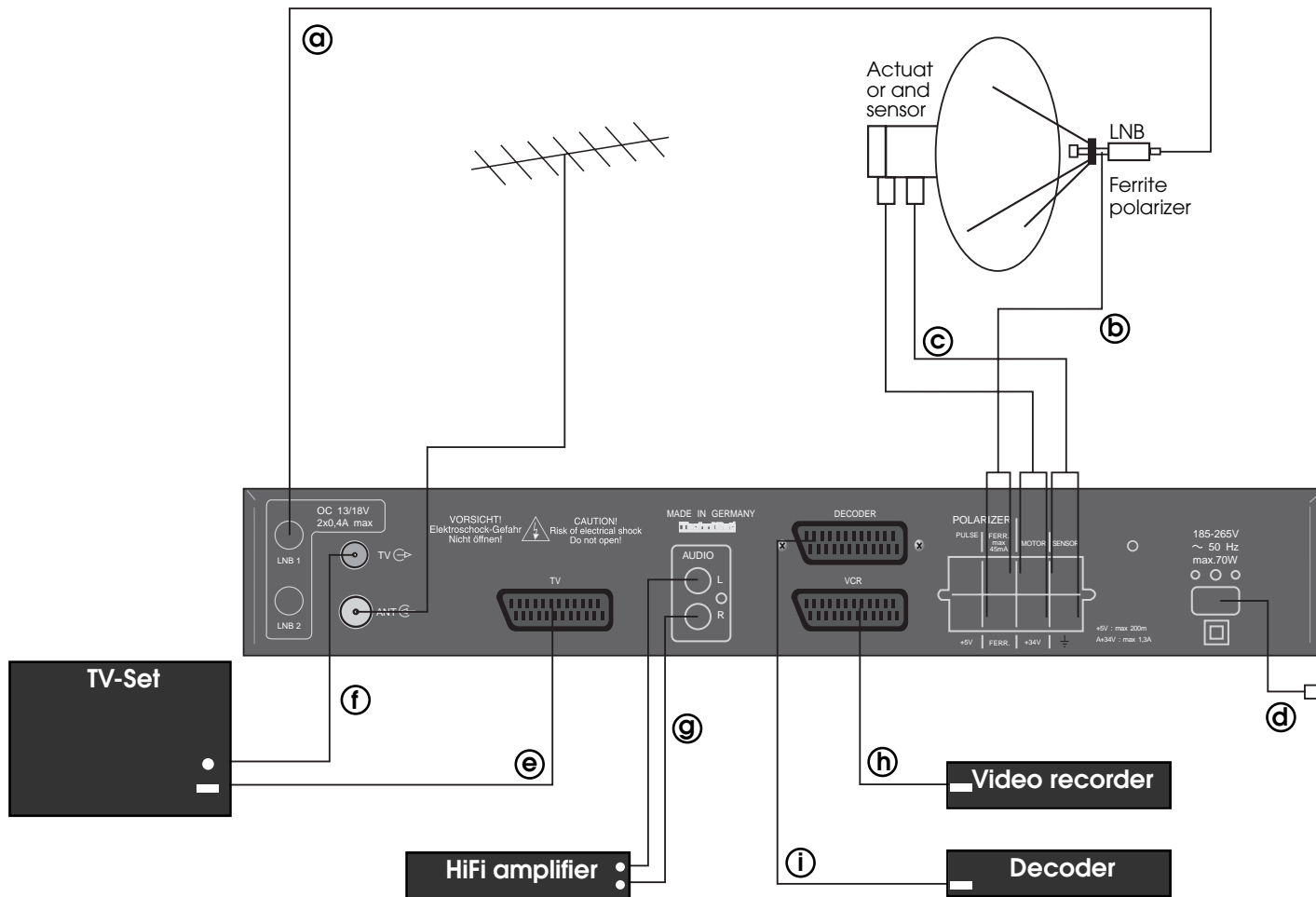
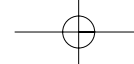
- > Press to store the transmission channel and to turn off

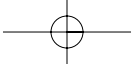
Channel no 45

4.3 Amplifier

- g) In order to achieve maximum sound quality the receiver can be connected to a Hifi amplifier. Use an adequate amplifier input (e.g. CD, Aux; Warning, the „phono“ input is not appropriate!) to link it with the receiver's audio R/L cinch jacks.









4.4 Video Cassette Recorder

h) Connect the video recorder to the SCART input marked „VCR”.

If the receiver is turned on, press the VCR key  play a video cassette. If the receiver is in standby mode (see 6.1) all audio and video signals are directed to the SCART output  provided the VCR produces an adequate switching signal.

4.5 Decoder

i) Plug the additional decoder to the SCART input marked „DECODER”.

You can toggle between four decoder signals to adapt to different decoding types.

A: „flat”, B: Baseband, C: Video unapplied, D: Video.

Consult the decoder’s user manual to find out which signals are required and select the signal type according to the description in chapter 7.6, „Setting up the decoder”.








5 Installation

Installation menu

- > basic setting
- language
- outdoor unit
- satellite scan
- autom. satellite scan
- decoder/OSD
- childproof control feature
- ext. programming



^/V/OK/STANDBY

Calling the installation menu

- > Press  to switch the receiver to standby mode.
- > Press  and  on the receiver at the same time and hold the keys down for appr. 2 secs.
- > Press  briefly.
- > Press  after terminating the settings to return to standby mode.

5.1 Basic setting

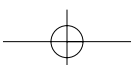
You can use the following settings to reset the receiver to its „original state”. Consequently, all the changes and settings you have chosen will be undone. The pre-programmation (see 8) is permanently stored and can be re-called anytime.

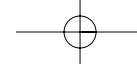
- > Display the installation menu (see above)
- > Press  to set pointer to „Basic Setting”
- > Press .

Basic setting

- > delete all
- load the pre-programmation


^/V/OK/STOP







5.1.1 Deleting all

All satellite positions and channel settings you have made will be deleted. You should not use this function other than when setting up your receiver for the first time.

- > Press   to set pointer to „delete all“
- > Press  .
- > Press  again.
- > After a few seconds, the receiver automatically returns to the installation menu.











- > Display the installation menu (see p. 8).
- > Press  to set pointer to „Sprache“ (language).
- > Press  .
- > After a few seconds, the receiver automatically returns to the installation menu.



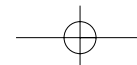
5.1.2 Loading the pre-programmation

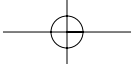
When loading the pre-programmation data, all your channel settings are deleted. The stored satellite positions will be retained, though. You should also use this function upon initial receiver set-up after you have deleted all settings.

- > Press  to set pointer to „basic setting“
- > Press  .
- > Press   to set pointer to „load pre-programmation“
- > Press  .
- > Press   .
- > After  seconds, the receiver automatically returns to the installation menu.

5.2 Language

The OSD display allows you to toggle between English, French, and German.





5.3 Outdoor unit

Both LNB inputs can be configured to use separate outdoor units.

Example: CombySat LNB set-up to accommodate the entire Ku band (between 10.7 and 12.75 GHz). (This LNB is also pre-configured)

- > Display the installation menu (see p. 8).
- > Press to set pointer to „Ausseneinheit“ (outdoor unit).



OK



```

Outdoor unit 1
band           Ku
> LNB typ     CombySat
auto-focus    on
polarizer     ferrite
LOF           normal
upper LOF    10750 MHz
lower LOF    9750 MHz

^/v/</>/0-9/MENU/OK/STOP
    
```

>
>
>
>
>
>
>

pointer to „LNB-Typ“



- > Press to select „CombySat“.



The receiver loads all the related local oscillator frequencies (LOFs) automatically.

- > Press to set pointer to „Polarizer“.
- > Press to toggle between „ferrite“ and „mechanical“.

This setting ds on the polarizer type you are using.



OK

Press to set pointer to „Band“ (band).
Press to select Ku band.

Press to set

OK

- > Press to set pointer to „Autofocus“.
- > Press to select „on“.

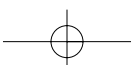
If you activate the auto-focus feature, the receiver detects the best antenna position upon each change of satellites.

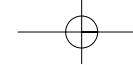
You can also customise the receiver's LNBs to different LOFs.

- > Press to set pointer to „LOF“.
- > Press to switch to „Andere“ (other)
- > Press to set pointer to „Obere LOF“ (upper LOF).
- > Press or use the ten-key keypad to select LOF.
- > Press .

The selected values are stored and the same menu is displayed to set up the second LNB input.

- > Select the values accordingly for the second LNB input.
- > Press to store.
- > The receiver automatically returns to the installation menu.





5.4 Satellite scan

The description of the scan feature assumes the following:

- The antenna trajectory has been duly adjusted.
- You have set up the right outdoor unit (see 5.3, „Outdoor unit“).
- You have mounted the linear/circular polarizer (part no. 2206 or 2207) according to the instructions.
- You know the westernmost and the easternmost satellites through antenna orientation.
- The actuator's limit sensors have been adjusted such that the motor is switched off before the mechanical limits of the antenna retaining system are exceeded in order to avoid damage on the paraboloidal-type reflector or the retaining system.

> Display the installation menu (see p. 8).

> Press **▲ ▼** to set pointer to „satellite scan“.

> Press **OK**

> Press **▲ ▼** to set pointer to „Satellit“.

> Press **◀ ▶** to select the easternmost satellite

(the example shows ASTRA 19.2° East)

> Press **▲ ▼** to set pointer to „Antennen-Posit“ (antenna position).

> Press **MENU** to turn off background.

```
Satellite scan
> satellite   ASTRA   19.0
  channel    PRO7   11.406 GHz
  stored position
  antenna position      5000
  west limit            0000
  east limit            9999
  antenna control      LNB 1
  optimise skew        117

^/v/</>/MENU/OK/STOP
```

Moving the antenna: Upon start-up the antenna begins to move slowly, but speeds up until you press the same key again.

> Briefly press **◀** .

Now, the antenna should move East. If the antenna moves West, press **◀** to halt and change the order of the wire connections.

> Press **◀** briefly when you have found a satellite.

> Press **◀ ▶** to make an exact set-up.

> Press **▲ ▼** to set pointer to „Gesp. Position“ (stored position).

> **Press ▶ to store (press ◀ to delete).**

> Press **▲ ▼** to set pointer to „Ostgrenze“ (East limit).

> Press **◀** or **▶** to store (the East limit is stored 10 pulses further East automatically).

> Press **▲ ▼** to set pointer to „Satellit“.

> Press **◀ ▶** to select the westernmost satellite (the example shows Hispasat 1 at 30° West).

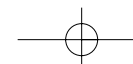
> Press **▲ ▼** to set pointer to „antenna-position“ (antenna position)

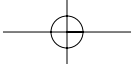
> Briefly press **▶** .

> Briefly press **▶** when you have found a satellite.

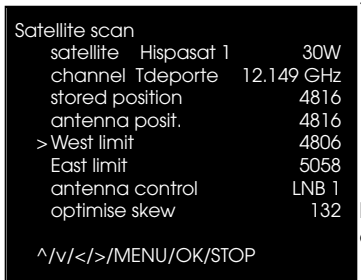
```
satellite scan
> satellite   ASTRA   19.20
  channel    PRO7   11.406 GHz
  stored position      5048
  antenna pos.        5048
  West limit          0000
  East limit          5058
  antenna control    LNB 1
  optimise skew      175

^/v/</>/MENU/OK/STOP
```





- > Press **◀ ▶** to make exact set-up.
- > Press **▲ ▼** to set pointer to „Gesp. Position“ (stored position).
- > Press **◀ ▶** or **◀ ▶** to store.
- > Press **◀ ▶** to set pointer to „Westgrenze“ (West limit).
- ▲ ▼**
- ◀ ▶**



Now you can find additional satellites using the automatic satellite scan feature (see 5.5).

If you start the „optimise skew“ feature, the optimal skew value is automatically selected.

- > Press **◀ ▶** to set pointer to „optimise skew“.
- > Press **▲ ▼** to optimise.
- ▶**

OK

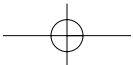
Warning: The calculated value is not stored. It is only used to simplify the satellite scan. Your polarizer should be mounted such that the pre-programmed skew values are correct for most of the channels (e.g. controlled for ASTRA). This is why only a few channels need skew correction. (see 7.7)

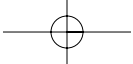


Press **◀ ▶** or **◀ ▶** to store (the West limit is stored 10 pulses further West automatically).

Adjusting to different outdoor units

- > Press **◀ ▶** to set pointer to „antenna control“.
- > Press **◀ ▶** or **◀ ▶** to select between:
 - „LNB 1“: Antenna only moves when receiving channels via LNB input 1 (e.g.: positioning mechanism on LNB input 1, fixed position antenna on LNB input 2).
 - „LNB 2“: Antenna only moves when receiving channels via LNB input 2 (e.g.: positioning mechanism on LNB input 2, fixed position antenna on LNB input 1).
 - „LNB 1 and 2“: Antenna moves when receiving channels via LNB inputs 1 or 2 (e.g.: positioning mechanism with 2 LNBS, such as Ku and C band).
 - „off“: Antenna does not move (e.g.: fixed position antenna).
- > Press **◀ ▶** to store and to return to the installation menu.





5.5 Automatic satellite scan

The automatic satellite scan feature only works from West to East. The following explanation assumes that the reflector has been oriented towards the westernmost satellite (Hispasat 1 at 30° West in our example) after having set up the East and West limits (see 5.4).

Satellites which are located beyond the East and West limits can not be selected by the automatic satellite scan. For this, you may need to extend the trajectory limits (see 5.4).

First of all, select the type of motor you are using: A for PFA reflectors with actuator, or B for offset reflectors with H/H mount.

- > Press **▲ ▼** to set pointer to „Decoder/OSD“.
- > Press **OK**.

```
Decoder/OSD
MAC/Eurocrypt      no
Videocrypt         no
TV scart           PAL
> motor type       A
^v/</>/OK/STOP
```

```
Automatic satellite scan
> satellite Hispasat 1 30W
channel TDeporte 12.149 GHz
stored position 4816
antenna position 4816
start scan
auto-focus
LNB input          1
optimise skew     132
^v/</>/MENU/OK/STOP
```

MENU

```
Automatic satellite scan
satellite Intels.601 27.5W
channel TravelCh 11.175 GHz
stored position
antenna position 4816
start scan
auto-focus
LNB input          1
optimise skew     132
^v/</>/MENU/OK/STOP
```

Press **▲ ▼** to set pointer to „motor type“.

Press **◀ ▶** to toggle between A and B

Press **OK** to return to the installation menu.

Press **▲ ▼** to set pointer to „automatic satellite scan“.

Press **OK**.

Press **▲ ▼** to set pointer to „satellite“.

Press **◀** to switch over to the next satellite West (Intelsat 601 at 27.5° West in our example).

Press **▶** to turn off background.

Briefly press **▶**.

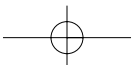
The antenna moves West to search for channels on the selected satellite. Once the receiver has found a satellite, it stops to find the best peak position (auto-focus).

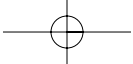
- > Press **▲ ▼** to set pointer to „Programm“ (channel).
- > Press **◀ ▶** to select and check if the receiver has found the desired satellite.

Warning: Not all satellite channels have permanent broadcasts. Also, the frequency mapping may vary from time to time. Check the most recent publications, such as the „Infosat“ magazine which is issued monthly.

When the desired satellite has been found:

- > Press **◀ ▶** to set pointer to „Gesp. Position“ (stored position).
- > Press **▶** to store.
- > Scan and store additional satellites east of the previous one, and follow the instructions above.





If the desired satellite has not been found:

- > Press **▲ ▼** to set pointer to „Suche starten“ (start scan).
- > Press **▶** to start again.

If, due to bad receive conditions, a satellite cannot be found using the automatic scan feature, you can search and store it manually (see 5.4), and proceed with the automatic scanning afterwards.

If you also use LNB input 2, you can assign it to a stored satellite.

- > Press **▲ ▼** to set pointer to „LNB-Eingang“.
- > Press **◀ ▶** to select.

The „optimise skew“ feature is identical to the one described in chapter 5.4.

You can activate the automatic selection of the best receive position (auto-focus) manually, as well:

- > Press **▲ ▼** to set pointer to „Autofokus“ (auto-focus).
- > Press **▶** to turn on.

For a description of how to select satellites which are not part of the pre-programmed **INDEX**, refer to chapter 7.8, „Setting up new satellites“.

INDEX

STOP

5.6 Correcting all satellite positions

If none of your stored satellite positions is peaked properly, you may need to correct the current antenna position.

Use this option with extra care since it may shift the satellites to incorrect positions.

- > Display the installation menu (see p.8).
- > Set pointer to satellite scan

```

satellite scan >
  satellit Hispasat 1 30W
  channel Teleporte 12.149 GHz >
  stored position 4816 >
> antenna position 4816
  west limit 4806
  east limit 5058
  antenna control LNB 1 >
  optimise skew 132

^/v/</>/MENU/OK/STOP

```

Call feature with OK.

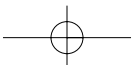
Press **OK** to set pointer to antenna position.

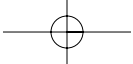
Press **◀ ▶** to turn the reflector until you have found the best receive quality for the satellite set up above.

- > Press **.**
- > Press **OK** to confirm the message „Sure?“
- > Press **.** to return without saving.

The stored position is finally used as the current antenna position.

If possible you should use a satellite with a poor receive quality to correct the positions of all satellites since this will be the most exact satellite to correct.





5.7 Decoder/OSD

If your television is equipped with RGB inputs you can select the OSD display to achieve optimal quality of character display.

Warning:
correctly wired (21-pin) SCART cord!

- > Display the installation menu (see p. 8).
- > Press **▲ ▼** to set pointer to „Decoder/OSD“



- > Press **STOP** to return to the installation menu.

The „MAC/Eurocrypt“ and „Videocrypt“ functions are intended for service purposes only.

This requires a

Press **OK**.

Press **▲ ▼** to set pointer to "TV SCART".

Press **◀**



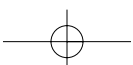
5.8 Childproof control feature

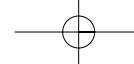
To secure the receiver against unauthorised use you can enter a secret code. Later on, this secret number is requested during normal operation any time you want to watch channels which are marked accordingly (see 6.8, „Childproof control feature“), or if you change your settings, e.g. when displaying the installation menu. To be able to control the receiver in cases where you have forgotten your secret number, you can use the global access number which is valid all the time. Check the last page of this manual to find out your global access number.

- > Display the installation menu (see p. 8).
- > Press **▲ ▼** to set pointer to „Kindersicherung“ (childproof control feature).
- > Press **OK**.
- > Enter the four digit secret code over the ten-key keypad (identical with the global access number if you have not defined any other number, so far).

Enter the new four digit secret number over the ten-key keypad. Repeat the secret number over the ten-key keypad.

- > After a few seconds the receiver automatically returns to the installation menu.





5.9 External Programming

You can copy programming changes to a second receiver.

The data transfer between both receivers requires an authentic SCART cord (21 pins).

- > Connect the SCART 3 output of receiver 1 with the SCART 3 input of receiver 2.

On both receivers:

- > display the installation menu (see p. 8).
- > press **▲** **▼** to set pointer to „ext. programmation“
- > press **OK** .

On target receiver to be re-programmed:

- > press **▲** **▼** to set pointer to „Ziel“ (target)
- > press **OK** to begin.

On source receiver to copy programming from:

- > press **▲** **▼** to set pointer to „Quelle“ (source)
- > press **OK** to begin.

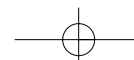
During the data transfer the screen displays a number between 1 and 127.

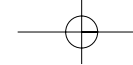
On the receiver with the new programming data:

- > press **▲** on the receiver.

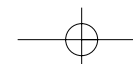
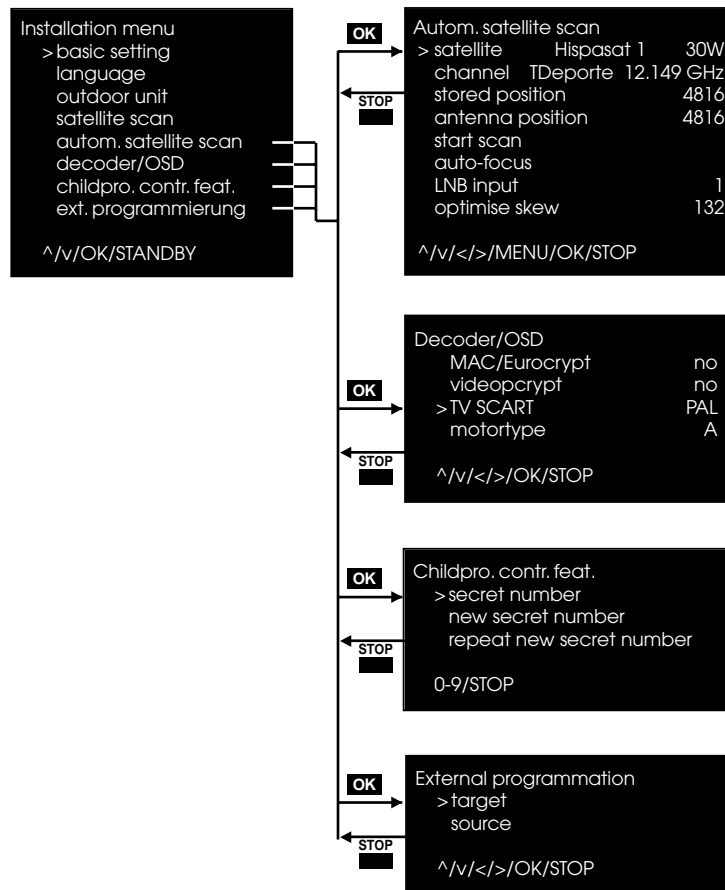
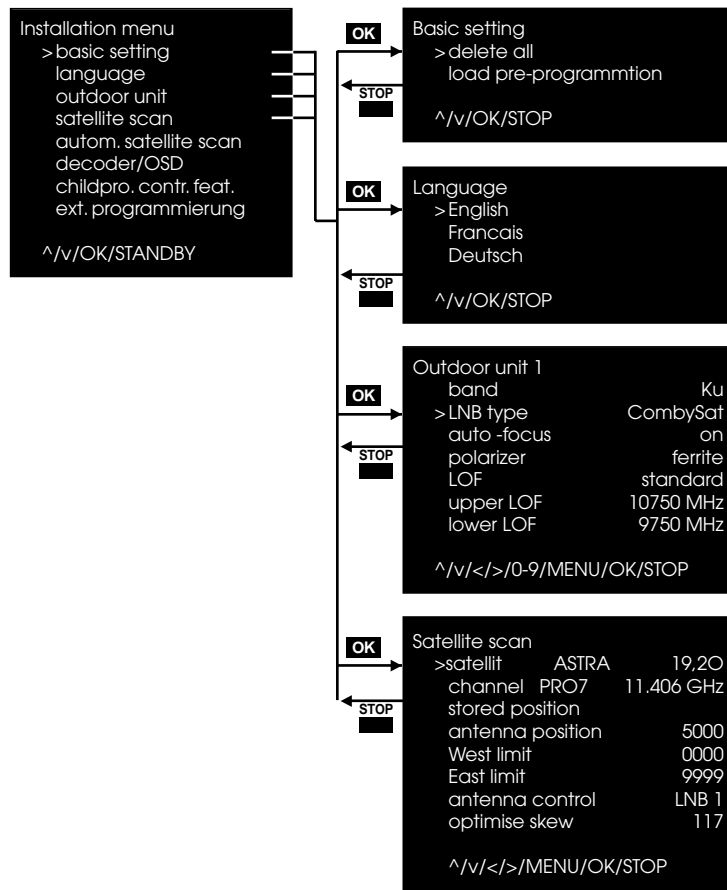
On both receivers:

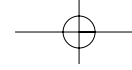
- > press **STOP** to return to the installation menu.





5.10 Menu overview





6 Operation

6.1 Switching on and off

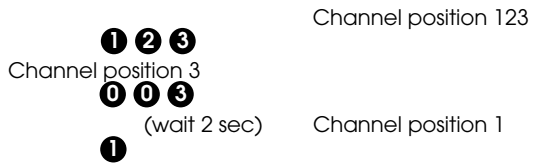
Preferably use the power-on switch **Netz** to turn the receiver on and off. This saves power and the environment.

For brief operational breaks use the remote control function:

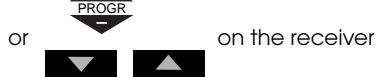
> Press to turn on and to switch to standby mode.

6.2 Selecting a channel

a) Using the ten-key keypad



b) Press on the remote control



c) Using channel lists

> press twice for TV channels, or three times for radio channels

> press to set pointer to desired channel.



> press **OK** or

> press to return to the channel previously selected.

The receiver only displays the channels of all stored satellites. Deleted channels (see 7.3) Are not displayed.

6.3 Selecting a satellite

a) By selecting a related channel, e.g.:

> Reflector peaks ASTRA and selects channel position 3.

b) Using the satellite list

> press once.

> press to set pointer to the desired satellite.

> press **OK** or

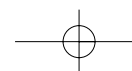
> press to return to the channel selected previously.

The receiver only displays the channels of all stored satellites.

6.4 Volume control

> press to turn down, or to turn up

> press to turn off completely.



6.5 TV/Radio control

The pre-programmed set of channels consists of 300 television and 200 radio channels. When receiving a radio channel, the TV screen is turned off and displays only the channel name on coloured background.

> Press  .

Press this button to change from a TV channel back to the most recently selected radio channel, and vice versa.

Warning: If the most recent TV or radio channel belongs to a different satellite, the dish moves to the respective satellite.

6.6 Displaying time and date

> Press  .

6.7 Setting the timer

You may define up to 4 different power-on and power-off times (timer). For each timer setting, you can choose between a single, daily or weekly event. Check if the clock has been set correctly and correct the time, if necessary (see 6.10).

> Press  .

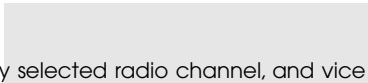
> Press   to set pointer to „Timer stellen“

> set time  .

```

Main menu
>set timer
set time
childproof control feature
channel menu

^/v/OK/STOP
    
```



0 0 3
 0 1 1 9 9 5
 2 1
 2 0 1 5
 2 2 0 0

STOP
 STOP

Press  .

```

Set timer
> timer 1 off
timer 2 off
timer 3 off
timer 4 off

^/v/OK/STOP
    
```

Example: Turn on PRO 7, ASTRA, on 21. January 1995 between 20.15 hrs and 22.00 hrs

> Press   to set pointer successively to:

```

„channel“
Timer 1
timer off
satellite ASTRA 19.2E
> channel 003 PRO7
month 01 1995
date 21 Saturday
start 20:15
stop 22:00
type once

^/v/</>/0-9/OK/STOP
    
```

> Press   to turn off the timer and to quit the menu.

> Press   twice to return to normal operation.

> Press  for standby mode.

The display shows **f 1** to symbolise timer mode.

If a timer has powered up the receiver you can only use the key to terminate the timer.

Daily or weekly timer events

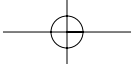
Press   to set pointer to e.g. „Timer 1“

Press  .

„month“
 „date“
 „start“

„stop“

Use   or the ten-key keypad to select.



> select timer (see above)

```

Timer 1
timer                off
satellite            ASTRA 19.2E
channel              001 ARD
month                01 1995
date                 21 Sunday
start                20:00
stop                 20:15
> type               daily
terminating date    27 12 1995
^/v/</>/0-9/OK/STOP
    
```

> press **▲ ▼** to set pointer to „terMinating date“

> press **◀ ▶** or use ten-key keypad to select.

> choose further settings as above.

The receiver powers up and down daily or weekly at the same time until the terminating date is reached.

Warning: Do not press **Netz (mains) to turn off the receiver while it is in timer mode!**

STOP

6.8 Childproof control feature

Start by entering your secret code in the installation menu (see 5.8).

The menu described below allows you to choose which radio and TV channels you want to protect. After this, all protected channels can only be accessed if the correct secret code has been entered. For easier control you only need to enter the secret code once. From then on, the number is valid until the receiver is switched to standby mode.

Example: You want to protect ARD, ASTRA, channel 001:

> press

```

MENU
press ▲
▼ to set
pointer to
„type“

press ▶
▶ to
s e l e c t
„daily“ or
„weekly“

Childproof control feature
> TV channel list
radio channel list
^/v/OK/STOP

TV channel list
> L 001  ARD  Astra  19,20
    002  ZDF  Astra  19,20
    003  Pro  Astra  19,20
    004  Sat  Astra  19,20
    005  RTL  Astra  19,20
    
```

> press **▶** to protect (press **◀** to undo the protection)

Protected channels are marked with an L. Open the „radio channel list“ to protect radio channels in the same manner.

> press **◀** to return to normal operation.

press **▲ ▼** to set pointer to „childproof control feature“.
press **OK** .

press **▲ ▼** to set pointer to „TV channel list“

press **OK** .

press **▲ ▼** to jump to channel 001

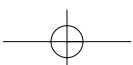
6.9 Playing the video recorder

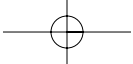
Receiver in standby mode:

> press the video recorder's play button

Receiver in operational mode:

> press the video recorder's play button.





- > press .
- > press to terminate.

6.10 Setting the clock



The time and date settings are also retained after longer operational breaks.

- press .
- press to set pointer to „set time“
- press .

Example: How to set the clock to 31. December 1995, 20.00 hrs

> press to set pointer successively to:

„hour“

2 0

„minute“

0 0

„month“

1 2

„date“

3 1

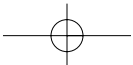
„year“

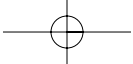
1 9 9 5

> press or use ten-key keypad to select.

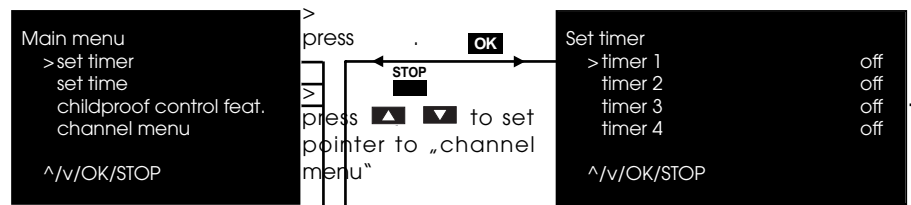
> press to initialise clock.

> press to return to normal operation.





Open the channel menu:



> press after making your changes to return to normal operation.

7.1 Copying channels

You can copy individual channels to different channel positions, e.g. to customise the channel sort order. The satellite settings will be retained, though; e.g.: if you copy an ASTRA channel to a position which has been occupied by a Kopernikus channel, the position is now related to the ASTRA satellite.

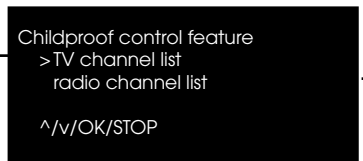
Example: how to copy Channel 3, Pro 7, to channel position 4

> select channel 3

> open the channel menu (see above)

> press ▲ ▼ to set pointer to „copy channel“

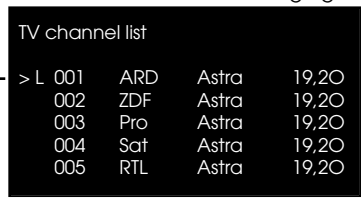
> press OK .



7.2 Changing channels

When changing the channels, all satellite settings will be retained.

Example: how to change channel 3, Pro 7, with channel 4, Sat 1



> press OK .

> press ◀ ▶ or use the ten-key keypad to select the second channel (004 in example).

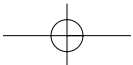
> after a few seconds the receiver automatically returns to the channel menu

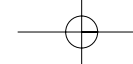
> press to return to normal operation.

press OK to copy

after a few seconds the receiver automatically returns to the channel menu.

press to return to





7 Changing the basic programming

You cannot select a channel using the **MENU** keys of the receiver or the **STOP** keys of the remote control, once it is deleted. Neither does it appear in the list of channels (see 6.2). Deleted channels can only be accessed when entering their channel number over the ten-key keypad.

```
Channel menu
> outdoor unit
  video settings
  audio settings
  copy channel
  change channel
  delete/open channel
  rename channel
  rename satellite
  new channels and satellites

^/v/OK/STOP
```

Example: How to delete channel 3, Pro 7

- > select channel 3
- > call the channel menu (see page 23)
- > press **▲ ▼** to set pointer to „delete/open channel“
- > press **OK** .
- > press **OK** to delete
- > after few seconds, the receiver returns to the channel menu automatically.

```
Copy channel
from          003 Pro 7
> to         004 Sat 1

^/v/</>/0-9/OK/STOP
```

How to recall a deleted channel:

- > select the channel using the ten-key keypad.
- > proceed as described above.

7.4 Renaming channels

Example: **STOP** to rename channel 3, Pro 7, to Pro 8

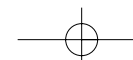
- > select channel 3.
- > call up the channel menu (see page 23).
- > press **▲ ▼** to set pointer to „rename channel“.
- > press **OK** .
- > press **▲ ▼** to select the first letter („P“ in our example).
- > press **▶** to activate the second letter.
- > press **▲ ▼** to select the second letter („r“ in our example).
- > press **▶** to activate the next letter, etc.

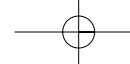
```
Change channels
> with          003 Pro 7
                004 Sat 1

^/v/</>/0-9/OK/STOP
```

When all letters are set:

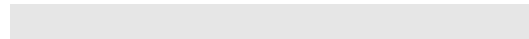
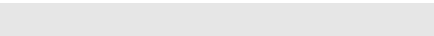
- > press **OK** to store.
- > after a few seconds the receiver automatically returns to the channel menu.





7.3 Deleting/recalling channels

> press  to return to normal operation.



Delete/call channel

delete channel ?

OK/STOP

Delete/call channel

call channel ?

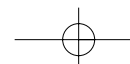
OK/STOP

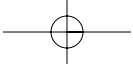
Rename change

old name	Pro 7
> new name	Pro 8***

^/v/</>/OK/STOP

STOP





7.5 Renaming satellites

Example: how to rename Astra to Astra 1

- > select the Astra satellite.
- > call up the channel menu (see page 23).
- > press **▲ ▼** to set pointer to „rename satellite“
- > press **OK** .



- > press **▲ ▼** to select the second letter („s“ in our example).
- > press **▶** for the next letter, etc.

When all letters are set:

- > press **OK** to store.
- > after a **STOP** seconds the receiver automatically returns to the channel menu.
- > press **▶** to return to normal operation.

7.6 Configuring a decoder

Example: how to set up the Premiere decoder to receive Premiere channel at position 22, Astra (refer to 4.5 for connection details)

- > select channel 22.
- > call up the channel menu (see page 23).

select the first letter („A“ in our example).

press **▲** to activate the second letter.



- > press **▶** to switch to „Ext“ (external).
- > press **▲ ▼** to set pointer to „Decodersignal“ (decoder signal).
- > press **▶** to select „D4“.

Different decoders may require other decoder signal settings (refer to decoder instructions).

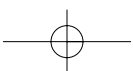
- > press **OK** to store and to return to the installation menu.
- > press **▶** to return to normal operation.

press **▲ ▼** to set pointer to „Videostellungen“ (video settings)

press **OK** .

press **▲ ▼** to set pointer to „Decoder“

STOP



7.7 Setting up new channels

If required, you can add new channels to the pre-programmed set of channels. For this purpose, each satellite provides blank channel positions (marked by *****).

Example:

programme RTL to channel position 143 (Hotbird 13° East). The information to do this is collected in the table of chapter 8, „Pre-programmed channels“, channel 128:

Transponder frequency:	11.596 MHz
Polarisation level:	Hor. skew + 100
Tuner bandwidth	36 MHz
LNB input	1
Polarity:	Normal
Brightness:	2
Audio bandwidth:	130 kHz
Deemphasis:	TMSP
Volume:	6
Audio frequency left channel:	7.02 MHz
Audio frequency right channel:	7.20 Mhz
Audio mode:	Stereo

Warning:

In all the menus described below, press the **MENU** key to turn off the coloured screen background which is used to check the settings.

- > select channel 143.
- > call the channel menu (see page 23).
- > press **▲ ▼** to set pointer to „new channels and satellites“.
- > press **OK**.
- > press **▲ ▼** to set pointer to „channel“.

How to

```

New channels and satellites >
satellite Hotbird-11 F 1 13a
> channel ***** 11.221 GHz
stored position 5068
antenna position 5068 >
LNB input 1
tuner bandwidth 27 MHz
additional settings >
signal level 077
^/v/</>/Index/MENU/OK/STOP
    
```

- > press **▶** to select „36 MHz“.
- > press **▲ ▼** to set pointer to „additional settings“.
- > press **▶** to select the menu „outdoor unit“.
- > press **▲ ▼** to set pointer to „AFC“.

```

Outdoor unit >
>skew +100
polarisation Skew >
22 kHz Aus
AFC An
optimise skew
signal level 175 >
^/v/</>/MENU/OK/STOP
    
```

- > press **▶** to turn on.
- press **OK** to store the parameters selected in this menu and to turn to the menu „video settings“.
- Press **▶** to select the next menu without memorising the settings.
- > press **▲ ▼** to set pointer to „brightness“.
- > press **◀ ▶** to select 2.

press **◀ ▶** or use the ten-key keypad to select 11.596 MHz.

press **▲ ▼** to set pointer to „LNB input“

press **▶** to select 1.

press **▲ ▼** to set

press **▶** to turn off.

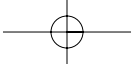
press **▲ ▼** to set pointer to „optimise skew“.

press **▶** to optimise.

press **▲ ▼** to set

MENU
■

STOP
■



```

Video settings
brightness          3
> polarity          Normal
decoder            Int
decoder signal     D4
^/v/</>/MENU/OK/STOP
    
```

> „Normal“.

```

Audio settings
> audio bandwidth  130 kHz
deemphasis        TMSP
basic volume      6
pre-adjustments   An
mode              Stereo
freq. left        7.02 MHz
freq. right       7.20 MHz
^/v/</>/0-9/MENU/OK/STOP
    
```

Press **STOP** select the next menu without memorising the settings.

INDEX

STOP

- > press **◀ ▶** to select „TMSP“.
- > press **▲ ▼** to set pointer to „basic volume“.
- > press **◀ ▶** to select 6.
- > press **▲ ▼** to set pointer to „mode“
- > press **◀ ▶** to select „Stereo“.

press **▲ ▼** to set pointer to „polarity“.

press **▶** to select

press **OK** to store the parameters selected in this menu and to turn to the menu „Audioeinstellungen“ (audio settings).

press **▲ ▼** to set pointer to „audio bandwidth“.

press **◀ ▶** to select „130 kHz“.

press **▲ ▼** to set pointer to „Deemphasis“

> press **▲ ▼** to set pointer to „Freq. left“.

> press **◀ ▶** to select „7.02 MHz“.

As the „Voreinstellungen“ (pre-adjustments) function has been turned On, the audio frequency of the right channel automatically changes to 7.20 MHz. Turn off the „Voreinstellung“ (pre-adjustment) setting to select separate frequencies and smaller increments on both audio channels.

> press **OK** to store the parameters selected in this menu and to return to the menu „Neue Programme und Satelliten“.

Press **STOP** to select the next menu without memorising the settings.

> press **▲ ▼** to set pointer to „Programm“ (channel).

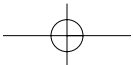
> press **◀ ▶**

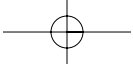
> press **▲ ▼ ◀ ▶** to select a new name and press **OK** to store.

> press **OK** to store and to return to the channel menu.

> press **STOP** to revert to normal operation.

The new name appears once you have changed channels.





7.8 Setting up new satellites

The pre-programmed set of channels consists of 300 television and 200 radio channels broadcast by the 18 most popular satellites. Those can be set up very easily using the installation menu (see 5.4). However, the pre-programmation also covers another 26 satellite names without channel assignments. Moreover, you can set up other satellites which are not covered in the preprogrammation. This assumes that you know the broadcasting data of at least one of the satellite's channels and its position. Since all channel positions are already covered by satellites you may need to overwrite the channels.

General procedure:

- > peak a pre-programmed satellite whose position is close to the new one.
- > select unwanted channels on the peaked satellite.
- > open the menu „new channels and satellites“ to select a new satellite name.
- > change the channel settings.
- > scan the satellite.
- > store its position.
- > set up further channels by copying them, as desired.

Example: This assumes that Eutelsat II F3 at 16° East has already been selected. The new satellite to set up is Astra at 19.2° East.

Warning: In all the menus described below, press the **INDEX** key to turn off the coloured screen background which is used to check the settings.

> select channel 127.

The receiver selects Eutelsat II F3 at 16° East, displaying channel „*****“.

> press **MENU** the channel menu (see page 23).

> press **▲ ▼** to set pointer to „Neue Programme und Satelliten“ (new channels and satellites).

> press **OK**.

> press **▲ ▼** to set pointer to „Satellit“.

> press **◀ ▶** to select a blank satellite name („*****“).

> press **▲ ▼ ▶ ◀**.

press **▲ ▼ ▶ ◀** to select a new name and to press **OK** to store.

```

New channels and satellites
satellite      Eutelsat II F3 16O
> channel      ***** 11.678 GHz
stored position 5037
antenna position 5037
LNB input      1
tuner bandwidth 27 MHz
additional settings
signal level    175

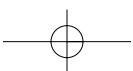
^/v/</>/Index/MENU/OK/STOP
    
```

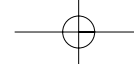
```

New channels and satellites
satellite      Astr*****
> channel      ***** 11.678 GHz
stored position 5037
antenna position 5037
LNB input      1
tuner bandwidth 27 MHz
additional settings
signal level    175

^/v/</>/Index/MENU/OK/STOP
    
```

INDEX





Channel data (taken from table in chapter 8, „Vorprogrammierte Programme“ (pre-programmed channels), channel 3, Pro 7)

Transponder frequency:	11.406 MHz
Polarisation level:	Vert. skew 000
Tuner bandwidth	27 MHz
LNB input	1
Polarity:	Normal
Brightness:	3
Audio bandwidth:	130 kHz
Deemphasis:	TMSP
Volume:	6
Audio frequency left channel:	7.02 MHz
Audio frequency right channel:	7.20 MHz
Audio mode:	Stereo

> select channel data of Pro 7 (see 7.7).

Turn off the AFC option and set the skew parameter to 0.

> press to set pointer to „antenna position“

> press to turn off background.

> press briefly.

The reflector moves East.

> briefly press when satellite has been found.

> press to set up exact position.

> press to set pointer to „stored position“.

> press to store.

> press to set pointer to „channel“.

> press .

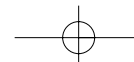
> press to select a new name and press to store.

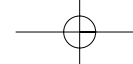
> open the menu „Ausseneinheit“ (outdoor unit) to optimise the skew value, turn on the AFC option and store.

> press to return to the channel menu.

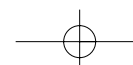
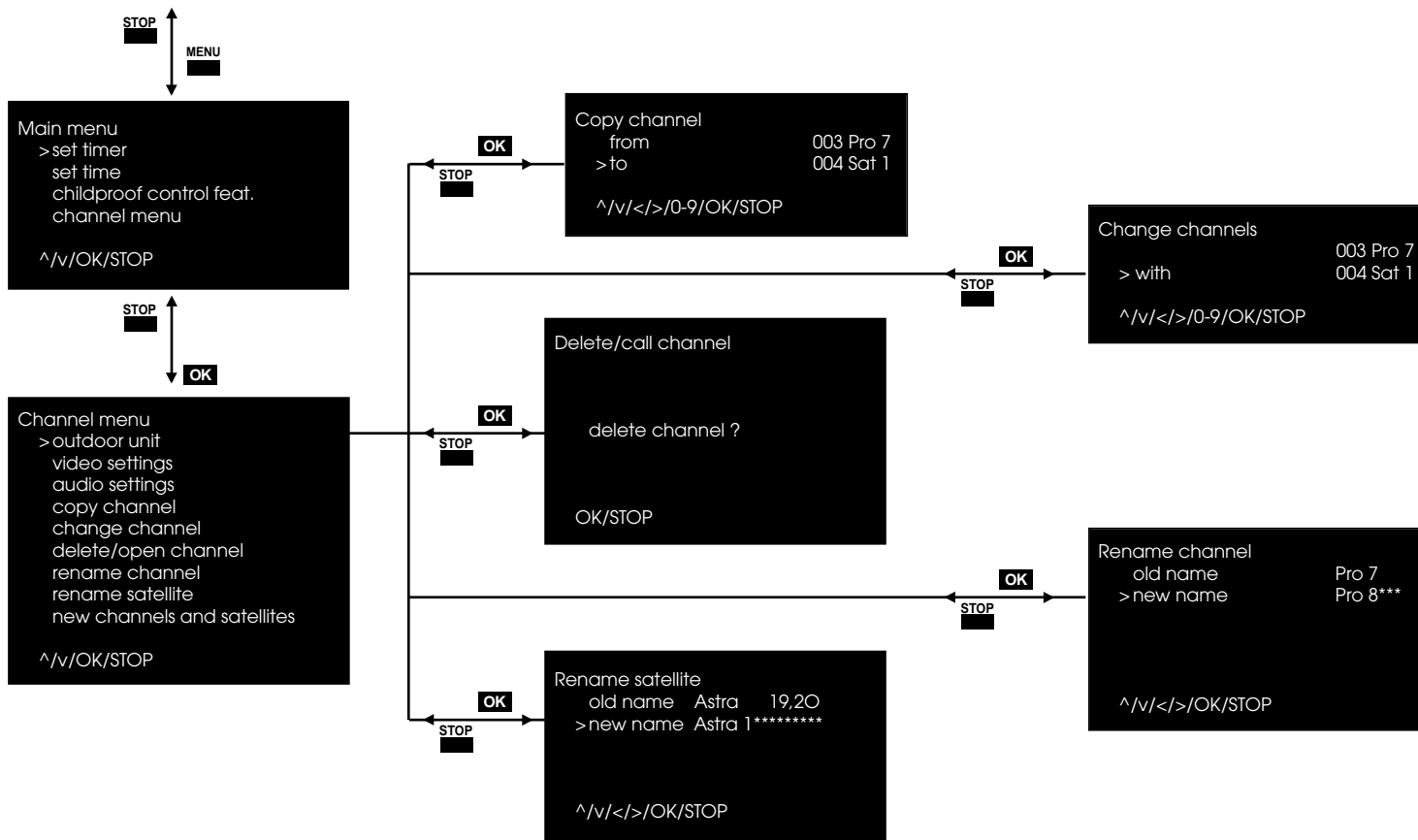
> press to return to normal operation.

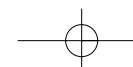
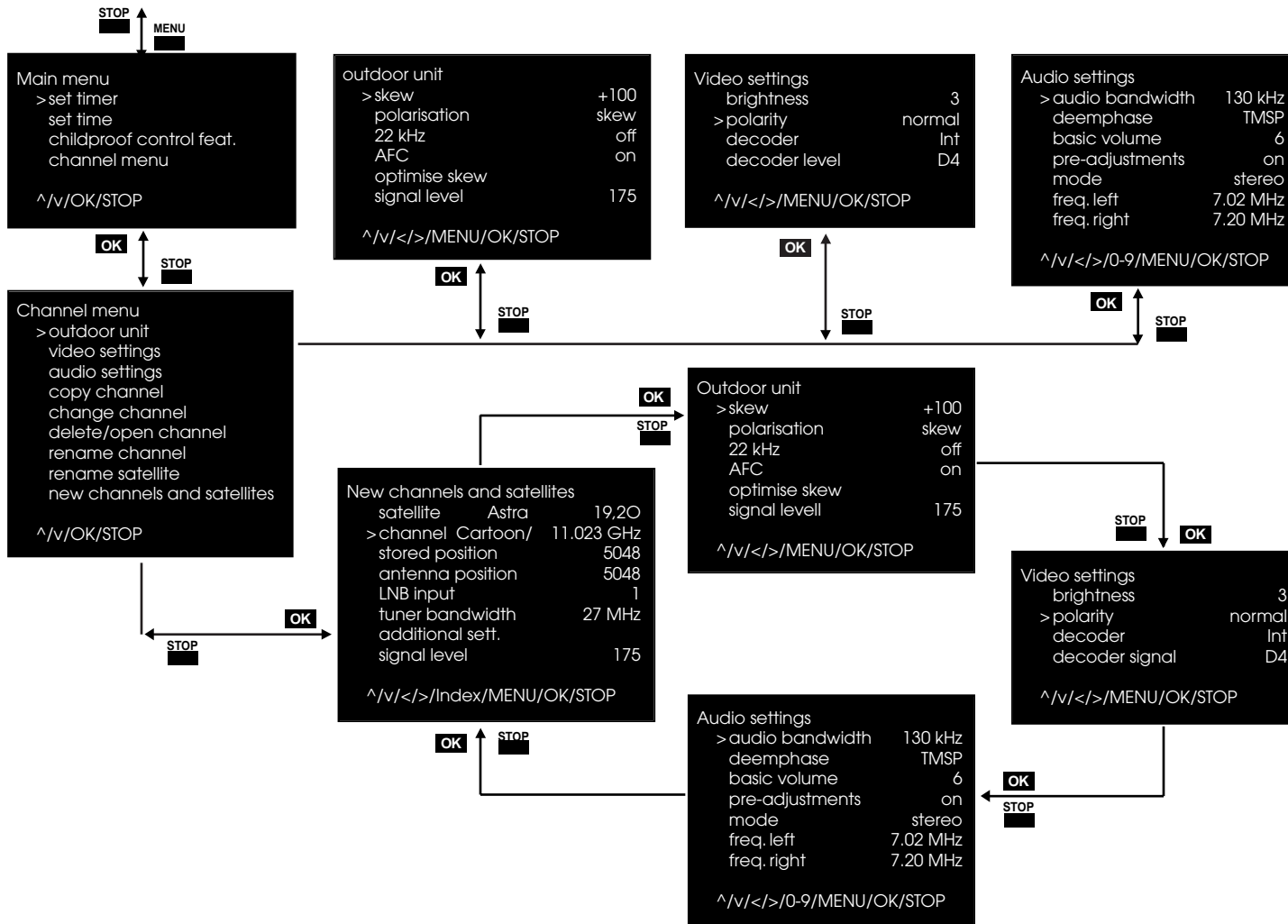
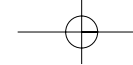
The new channel name is displayed once you have changed channels.

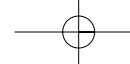




7.9 Menu overview





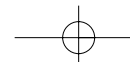


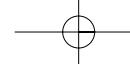
8 Pre-programmed channels

8.1 Television channels

Position	Channel name	Video				Audio					
		Tuner band- freq. (MHz)	Tuner band- width (MHz)	Polarisation	Video control	Frequency left (MHz)	Frequency right (MHz)	IF band- width (kHz)	Mono/Stereo	Deemphasis	Volume
ASTRA 19,2° East											
1	ARD	11494	27	H	3	7,02	7,2	130	S	TMSP	5
2	ZDF	10964	27	H	3	7,02	7,2	130	S	TMSP	5
3	Pro 7	11406	27	V	3	7,02	7,2	130	S	TMSP	5
4	Sat 1	11288	27	V	3	7,02	7,2	130	S	TMSP	5
5	RTL	11229	27	V	3	7,02	7,2	130	S	TMSP	5
6	RTL 2	11214	27	H	3	7,02	7,2	130	S	TMSP	5
7	Vox	11273	27	H	3	7,02	7,2	130	S	TMSP	5
8	3 Sat	11347	27	V	3	7,02	7,2	130	S	TMSP	5
9	West 3	11053	27	H	3	7,02	7,2	130	S	TMSP	5
10	Bayern 3	11141	27	H	3	7,02	7,2	130	S	TMSP	5
11	S 3	11186	27	V	3	7,02	7,2	130	S	TMSP	5
12	N 3	11582	27	H	3	7,02	7,2	130	S	TMSP	5
13	MDR 3	11112	27	H	3	7,02	7,2	130	S	TMSP	5
14	DSF	11523	27	H	3	7,02	7,2	130	S	TMSP	5
15	Eurosport	11259	27	V	3	7,2	7,2	130	M	TMSP	5
16	n-tv	11641	27	H	3	7,02	7,2	130	S	TMSP	5
17	MTV Euro	11421	27	H	3	7,02	7,2	130	S	TMSP	5
18	Cartoon/TNT	11023	27	H	3	7,02	7,2	130	S	TMSP	5
19	CNN	11627	27	V	3	7,02	7,02	130	M	TMSP	5
20	Sky News	11377	27	V	3	7,02	7,2	130	S	TMSP	5
21	Galavision	11127	27	V	3	7,02	7,2	130	S	TMSP	5
22	Premiere	11464	27	H	3	7,02	7,2	130	S	TMSP	5
23	Teleclub	11332	27	H	3	7,02	7,2	130	S	TMSP	5
24	RTL 4	11391	27	H	3	7,02	7,2	130	S	TMSP	5
25	RTL 5	10936	27	V	3	7,02	7,2	130	S	TMSP	5
26	S Movies	11436	27	V	3	7,02	7,2	130	S	TMSP	5
27	MovieCh.	11479	27	V	3	7,02	7,2	130	S	TMSP	5

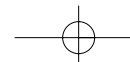
Position	Channel name	Video				Audio					
		Tuner band- freq. (MHz)	Tuner band- width (MHz)	Polarisation	Video control	Frequency left (MHz)	Frequency right (MHz)	IF band- width (kHz)	Mono/Stereo	Deemphasis	Volume
28	S.M.Gold	11597	27	V	3	7,02	7,2	130	S	TMSP	5
29	S.Sports	11509	27	V	3	7,02	7,2	130	S	TMSP	5
30	SSports2	11171	27	H	3	7,02	7,2	130	S	TMSP	5
31	Sky One	11318	27	V	3	7,02	7,2	130	S	TMSP	5
32	Nickelodeon	11156	27	V	3	7,02	7,2	130	S	TMSP	5
33	Bravo/Ad	11097	27	V	3	7,02	7,2	130	S	TMSP	5
34	Discover	11082	27	H	3	7,02	7,2	130	S	TMSP	5
35	TCC/F.Ch	10994	27	H	3	7,02	7,2	130	S	TMSP	5
36	UK Gold	11553	27	H	3	7,02	7,2	130	S	TMSP	5
37	QVC	11038	27	V	3	7,02	7,2	130	S	TMSP	5
38	UK Living	10979	27	V	3	7,02	7,2	130	S	TMSP	5
39	JSTV/CMT	11568	27	V	3	7,02	7,2	130	S	TMSP	5
40	VH 1	11538	27	V	3	7,02	7,2	130	S	TMSP	5
41	Mini Max	11009	27	V	3	7,02	7,2	130	S	TMSP	5
42	Cine Classics	11068	27	V	3	7,02	7,2	130	S	TMSP	5
43	Cinermania	11656	27	V	3	7,02	7,2	130	S	TMSP	5
44	Documania	11686	27	V	3	7,02	7,2	130	S	TMSP	5
45	FilmNet	10921	27	H	3	7,02	7,2	130	S	TMSP	5
46	FilmNet+	11362	27	H	3	-	-	-	-	-	-
47	TV 1000	11303	27	H	3	-	-	-	-	-	-
48	TV3 Schw	11244	27	H	3	-	-	-	-	-	-
49	TV3 Daen	11612	27	H	3	-	-	-	-	-	-
50	TV3 Norw	11671	27	H	3	-	-	-	-	-	-
51	Arte	10714	27	H	3	7,02	7,2	130	S	TMSP	5
52	NBC Super	10729	27	V	3	7,02	7,2	130	S	TMSP	5
53	RTL Disney	10744	27	H	3	7,02	7,2	130	S	TMSP	5
54	RTL 4	10758	27	V	3	7,02	7,2	130	S	TMSP	5
55	Sky Mov. 2	10773	27	H	3	7,02	7,2	130	S	TMSP	5
56	TV Asia	10788	27	V	3	7,02	7,2	130	S	TMSP	5
57	Teleclub	10803	27	H	3	7,02	7,2	130	S	TMSP	5
58	H.O.T.	10817	27	V	3	7,02	7,2	130	S	TMSP	5
59	Movie Ch. 2	10832	27	H	3	7,02	7,2	130	S	TMSP	5
60	Sky Arts	10847	27	V	3	7,02	7,2	130	S	TMSP	5
61	VH 1 Germ.	10862	27	H	3	7,02	7,2	130	S	TMSP	5

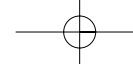




Position	Channel name	Video				Audio					
		Transponder freq. (MHz)	Tuner band- width (MHz)	Polarisation	Video control	Frequency left (MHz)	Frequency right (MHz)	IF band- width (KHz)	Mono/Stereo	Deemphasis	Volume
62	RTL Veron.	10876	27	V	3	7,02	7,2	130	S	TMSP	5
63	Beta Spart.	10891	27	H	3	7,02	7,2	130	S	TMSP	5
64	Kabel Plus	10906	27	V	3	7,02	7,2	130	S	TMSP	5
Intelsat 602 63° East											
65	RETE 4	11011	36	H	2	6,6	6,6	350	M	J17	0
66	Cinques.	11055	36	H	2	6,6	6,6	350	M	J17	0
67	Italia 1	11137	36	H	2	6,6	6,6	350	M	J17	0
68	Canale 5	11173	36	H	2	6,6	6,6	350	M	J17	0
69	IRIB TV1	11155	36	V	2	6,8	6,8	350	M	J17	0
70	IRIB TV2	11002	36	V	2	6,8	6,8	350	M	J17	0
71	IRIB TV3	11100	36	V	2	6,8	6,8	350	M	J17	0
72	*****	11406	36	V	2	7,02	7,2	130	S	TMSP	5
73	*****	11406	36	V	2	7,02	7,2	130	S	TMSP	5
74	*****	11173	36	H	2	6,6	6,6	350	M	J17	0
75	*****	11173	36	H	2	6,6	6,6	350	M	J17	0
Intelsat 604 60° East											
76	TRT 1	11647	36	H	2	6,8	6,8	350	M	J17	0
77	TRT 2	11683	36	H	2	6,8	6,8	350	M	J17	0
78	TRT 3	11138	36	H	2	6,8	6,8	350	M	J17	0
79	TRT 4	10974	36	H	2	6,8	6,8	350	M	J17	0
80	*****	11010	36	H	2	6,6	6,6	350	M	J17	0
81	*****	11034	36	H	2	6,8	6,8	350	M	J17	0
Türksat 1B 42° East											
82	Show TV	11175	36	H	2	6,6	6,6	350	M	J17	0
83	Kanal 6	11080	36	H	2	6,6	6,6	350	M	J17	0
84	TRT Avr.	11472	36	V	2	6,6	6,6	350	M	J17	0
85	*****	10970	36	V	2	6,6	6,6	350	M	J17	0
86	Kanal D	11012	36	V	2	6,6	6,6	350	M	J17	0
87	TRT 1	11556	36	H	2	6,6	6,6	350	M	J17	0
88	TRT 2	11592	36	H	2	6,6	6,6	350	M	J17	0
89	TRT 3	11644	36	H	2	6,6	6,6	350	M	J17	0

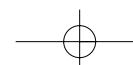
Position	Channel name	Video				Audio					
		Transponder freq. (MHz)	Tuner band- width (MHz)	Polarisation	Video control	Frequency left (MHz)	Frequency right (MHz)	IF band- width (KHz)	Mono/Stereo	Deemphasis	Volume
90	TRT 4	11680	36	H	2	6,6	6,6	350	M	J17	0
91	Kanal D	11030	36	H	2	6,6	6,6	350	M	J17	0
92	*****	10980	36	H	2	6,6	6,6	350	M	J17	0
93	*****	11130	36	H	2	6,6	6,6	350	M	J17	0
94	*****	11678	36	V	2	6,6	6,6	350	M	J17	0
DSF Kopernikus 2 28,5° East											
95	*****	11486	36	H	2	6,6	6,6	350	M	J17	0
96	Niedersachsen	12725	36	V	2	6,65	6,65	200	M	50uS	2
97	NordLive	12625	36	H	2	6,65	6,65	200	M	50uS	2
98	*****	11525	36	H	2	6,65	6,65	200	M	50uS	2
99	*****	11475	36	H	2	6,65	6,65	200	M	50uS	2
DSF Kopernikus 1 23,5° East											
100	PRO 7	12559	36	H	2	7,38	7,56	130	S	TMSP	5
101	*****	11625	36	H	2	7,38	7,56	130	S	TMSP	5
102	SAT1	11475	36	H	2	7,02	7,2	130	S	TMSP	5
103	*****	11675	36	H	2	7,38	7,56	130	S	TMSP	5
104	*****	11525	36	H	2	7,02	7,2	130	S	TMSP	5
105	Vox	11600	36	V	2	7,02	7,2	130	S	TMSP	5
106	ARTE	11549	36	V	2	7,02	7,2	130	S	TMSP	5
107	DSF	12692	36	H	2	7,38	7,56	130	S	TMSP	5
108	Premiere	12591	36	V	2	7,02	7,2	130	S	TMSP	5
109	*****	12725	36	V	2	7,02	7,2	130	S	TMSP	5
110	*****	12524	36	V	2	6,65	6,65	200	M	50uS	2
Eutelsat II-F3 16° East											
111	RTM Mar.	10972	36	V	2	6,6	6,6	280	M	50uS	1
112	Canal+	11617	36	V	2	6,6	6,6	280	M	50uS	5
113	TV7 Tun.	11659	36	V	2	6,6	6,6	280	M	50uS	1
114	EUROSTEP	10987	36	H	2	6,65	6,65	200	M	50uS	2
115	TGRT	11095	36	V	2	6,65	6,65	280	M	50uS	1
116	EgyptSat	11178	36	V	2	6,6	6,6	280	M	50uS	1
117	Muslim TV	11575	36	V	2	6,5	6,5	280	M	50uS	1

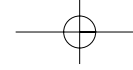




Position	Channel name	Video					Audio				Volume
		Transponder freq. (MHz)	Tuner band-width (MHz)	Polarisation	Video control	Frequency left (MHz)	Frequency right (MHz)	IF band-width (kHz)	Mono/Stereo	Deemphasis	
118	Duna TV	11596	36	H	2	6,6	6,6	280	M	50uS	1
119	Polonia	11081	36	H	2	7,02	7,2	130	S	TMSP	5
120	Polsat	11638	36	H	2	6,65	6,65	280	M	50uS	1
121	TV Plus	11556	36	H	2	-	-	-	-	-	-
122	Business-TV	11163	36	H	2	6,6	6,6	280	M	50uS	1
123	Algerian	11678	36	H	2	6,6	6,6	280	M	50uS	1
124	Nile TV	11145	36	V	2	6,65	6,65	280	M	50uS	1
125	TGRT-Zus	11063	36	V	2	6,65	6,65	280	M	50uS	1
126	*****	11678	36	H	2	6,6	6,6	280	M	50uS	1
127	*****	11678	36	H	2	6,6	6,6	280	M	50uS	1
Hotbird und Eutelsat II-F1 13° East											
128	RTL	11596	36	H	2	7,02	7,2	130	S	TMSP	5
129	RTL 2	11095	36	H	2	7,02	7,2	130	S	TMSP	5
130	D.W.TV	11163	36	V	2	6,65	6,65	200	M	50uS	2
131	MTV Euro	11659	36	V	2	7,02	7,2	130	S	TMSP	5
132	VIVA	11005	36	H	2	7,02	7,2	130	S	TMSP	5
133	Eurosport	10972	36	H	2	7,2	7,2	130	M	TMSP	5
134	Euronews	11575	36	V	2	6,65	6,65	280	M	50uS	1
135	BBC News	11617	36	V	2	7,02	7,2	130	S	TMSP	5
136	Kabelkanal	11055	36	H	2	7,02	7,2	130	S	TMSP	5
137	TRT int	11181	36	H	2	6,65	6,65	200	M	50uS	2
138	mbc	11555	36	H	2	7,02	7,2	130	S	TMSP	5
139	EDTV	11638	36	H	2	7,02	7,2	130	S	TMSP	5
140	Polonia1	11678	36	H	2	6,6	6,6	280	M	50uS	1
141	Super Ch	10987	36	V	2	7,2	7,2	130	M	TMSP	5
142	TV5 Euro	11080	36	V	2	6,6	6,6	280	M	50uS	1
143	TVE int.	11221	36	H	2	7,02	7,2	130	S	TMSP	5
144	MTV Euro	11232	36	V	2	7,02	7,2	130	S	TMSP	5
145	EBN	11262	36	H	2	7,02	7,2	130	S	TMSP	5
145	Sci-Fi/ART	11283	36	V	2	7,02	7,2	130	S	TMSP	5
147	MCM Euro	11304	36	H	2	-	-	-	-	-	-
148	TV 5 Euro	11325	36	V	2	7,02	7,2	130	S	TMSP	5
149	Premiera	11345	36	H	2	7,02	7,2	130	S	TMSP	5

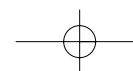
Position	Channel name	Video					Audio				Volume
		Transponder freq. (MHz)	Tuner band-width (MHz)	Polarisation	Video control	Frequency left (MHz)	Frequency right (MHz)	IF band-width (kHz)	Mono/Stereo	Deemphasis	
150	Super RTL	11366	36	V	2	7,02	7,2	130	S	TMSP	5
151	Eurosport	11387	36	H	2	7,02	7,2	130	S	TMSP	5
152	C. Horizons	11408	36	V	2	-	-	-	-	-	-
153	TV Pol.	11428	36	H	2	7,02	7,2	130	S	TMSP	5
154	RAI UNO	11449	36	V	2	7,02	7,2	130	S	TMSP	5
155	NPT Pol.	11471	36	H	2	7,02	7,2	130	S	TMSP	5
156	RAI DUE	11492	36	V	2	7,02	7,2	130	S	TMSP	5
157	EDTV	11513	36	H	2	7,02	7,2	130	S	TMSP	5
158	RTL 7	11534	36	V	2	7,02	7,2	130	S	TMSP	5
159	Reuters	12521	36	H	2	6,65	6,65	200	M	50uS	2
160	Kindera.	12563	36	H	2	6,65	6,65	200	M	50uS	2
161	ÜberTra.	12584	36	V	2	6,65	6,65	200	M	50uS	2
162	*****	11534	36	V	2	7,02	7,2	130	S	TMSP	5
163	*****	11596	36	H	2	7,02	7,2	130	S	TMSP	5
164	*****	12725	36	V	2	7,02	7,2	130	S	TMSP	5
165	*****	12725	36	V	2	7,02	7,2	130	S	TMSP	5
166	*****	11678	36	H	2	7,02	7,2	130	S	TMSP	5
167	*****	11678	36	H	2	7,02	7,2	130	S	TMSP	5
168	*****	11138	36	V	2	6,65	6,65	200	M	50uS	2
169	*****	12583	36	V	2	6,65	6,65	200	M	50uS	2
170	*****	12583	36	V	2	6,65	6,65	200	M	50uS	2
Eutelsat II-F2 10° East											
171	RAI UNO	10972	36	V	2	6,6	6,6	350	M	J17	0
172	RAI DUE	11095	36	V	2	6,6	6,6	350	M	J17	0
173	*****	11575	36	V	2	6,65	6,65	280	M	50uS	1
174	Inf.STAR	11617	36	V	2	6,65	6,65	280	M	50uS	1
175	RIP	11659	36	V	2	6,6	6,6	280	M	50uS	1
176	Aktif TV	10987	36	H	2	6,65	6,65	280	M	50uS	1
177	TVE Int.	11149	36	H	2	6,65	6,65	280	M	50uS	1
178	*****	11077	36	H	2	6,65	6,65	280	M	50uS	2
179	AFN TV	11178	36	V	2	6,65	6,65	200	M	50uS	2
180	Satel 2	11017	36	H	2	6,65	6,65	280	M	50uS	1
181	*****	11596	36	H	2	6,65	6,65	200	M	50uS	2

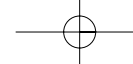




Position	Channel name	Video					Audio					Volume
		Transponder freq. (MHz)	Tuner band width (MHz)	Polarisation	Video control	Frequency left (MHz)	Frequency right (MHz)	IF band width (kHz)	Mono/Stereo	Deemphasis		
Eutelsat II-F4 7° East												
182	*****	12583	36	V	2	6,65	6,65	200	M	50uS	2	
183	RIK Nik.	11144	36	H	2	6,6	6,6	280	M	50uS	1	
184	EPT-ET 1	11178	36	H	2	6,6	6,6	280	M	50uS	1	
185	*****	11133	36	V	2	6,6	6,6	280	M	50uS	1	
186	*****	11575	36	V	2	6,6	6,6	280	M	50uS	1	
Tele X und Sirius 5° East												
187	TV3 Sve.	11785	27	R	3	6,5	6,5	200	M	50uS	2	
188	TV4 Sve.	11938	27	R	3	7,02	7,2	130	S	TMSP	5	
189	TV 6	11862	27	R	3	6,5	6,5	200	M	50uS	2	
190	Z-TV	12092	27	R	3	6,5	6,5	200	M	50uS	2	
191	Femman	12475	27	L	3	7,02	7,2	130	S	TMSP	5	
192	FilmMax	12015	27	R	3	-	-	-	-	-	-	
193	STV 2	12322	27	L	3	-	-	-	-	-	-	
194	*****	11658	36	V	2	6,65	6,65	200	M	50uS	2	
195	*****	11638	36	H	2	6,65	6,65	200	M	50uS	2	
196	*****	11747	27	L	3	7,02	7,2	130	S	TMSP	5	
197	*****	11823	27	L	3	7,02	7,2	130	S	TMSP	5	
198	*****	11900	27	L	3	7,02	7,2	130	S	TMSP	5	
199	*****	12054	27	L	3	7,02	7,2	130	S	TMSP	5	
200	*****	11977	27	L	3	7,02	7,2	130	S	TMSP	5	
201	*****	11617	36	V	2	6,65	6,65	200	M	50uS	2	
Thor und Intelsat 702 1° West												
202	CNN Nor.	11785	27	R	3	-	-	-	-	-	-	
203	Eurosport	11862	27	R	3	-	-	-	-	-	-	
204	Filmnet	12015	27	R	3	-	-	-	-	-	-	
205	Discover	11938	27	R	3	-	-	-	-	-	-	
206	MTV Euro	12092	27	R	3	-	-	-	-	-	-	
207	*****	11783	36	R	2	-	-	-	-	-	-	
208	*****	11783	36	R	2	-	-	-	-	-	-	
209	TV Norge	11016	27	H	3	6,6	6,6	280	M	50uS	1	
210	TV3Norge	11096	27	H	3	-	-	-	-	-	-	

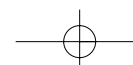
Position	Channel name	Video					Audio					Volume
		Transponder freq. (MHz)	Tuner band width (MHz)	Polarisation	Video control	Frequency left (MHz)	Frequency right (MHz)	IF band width (kHz)	Mono/Stereo	Deemphasis		
211	NRK	11176	27	H	3	7,02	7,2	130	S	TMSP	5	
212	Norsk TV	11555	27	H	3	-	-	-	-	-	-	
213	Kanal 1	11679	27	H	3	-	-	-	-	-	-	
214	TV 1000	11054	27	V	3	-	-	-	-	-	-	
215	TV1000 Cinema	11478	27	V	3	-	-	-	-	-	-	
216	TV3 Danmark	11597	27	V	3	-	-	-	-	-	-	
217	*****	11013	27	V	3	-	-	-	-	-	-	
218	*****	11016	36	H	2	-	-	-	-	-	-	
Telecom 2B 5° West												
219	M6	12522	36	V	2	5,8	5,8	280	M	J17	0	
220	France 2	12564	36	V	2	5,8	5,8	280	M	J17	0	
221	La Cinq	12606	36	V	2	5,8	5,8	280	M	J17	0	
222	TF1	12690	36	V	2	5,8	5,8	280	M	J17	0	
223	RTL Fr.	12732	36	V	2	6,6	6,6	280	M	J17	0	
224	LaChaine	12585	36	H	2	6,6	6,6	280	M	J17	0	
225	T.M.C.	12648	36	V	2	5,8	5,8	280	M	J17	0	
226	Cinefil	12627	36	H	2	5,8	5,8	280	M	J17	0	
227	Cinemas	12669	36	H	2	-	-	-	-	-	-	
228	RTL	12544	36	H	2	6,6	6,6	280	M	J17	0	
229	*****	12544	36	H	2	5,8	5,8	280	M	J17	0	
Telecom 2A 8° West												
230	MCM Euro	12543	36	H	2	7,02	7,2	130	S	TMSP	5	
231	Planete	12585	36	H	2	5,4	6,6	130	S	TMSP	5	
232	Cinefil	12627	36	H	2	6,6	6,6	130	M	TMSP	5	
233	Cinemas	12669	36	H	2	6,6	6,6	130	M	TMSP	5	
234	Eurosport	12711	36	H	2	6,6	6,6	130	M	TMSP	5	
235	ParisPlu	12564	36	V	2	6,6	6,6	130	M	TMSP	5	
236	Canal +	12648	36	V	2	6,6	6,6	130	M	TMSP	5	
237	Canal J	12732	36	V	2	6,6	6,6	130	M	TMSP	5	
238	Canal +	12522	36	V	2	-	-	-	-	-	-	
239	Fr.S.Vis	12606	36	V	2	7,02	7,2	130	S	TMSP	5	
240	CineCine	12690	36	V	2	-	-	-	-	-	-	

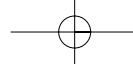




Position	Channel name	Video					Audio				
		Transponder freq. (MHz)	Tuner band width (MHz)	Polarisation	Video control	Frequency left (MHz)	Frequency right (MHz)	IF band width (kHz)	Mono/Stereo	Deemphasis	Volume
241	*****	10500	36	H	2	5,4	6,6	130	S	TMSP	5
242	*****	10500	36	H	2	5,4	6,6	130	S	TMSP	5
243	*****	11016	36	H	2	6,6	6,6	280	M	50uS	2
244	*****	11133	36	H	2	6,6	6,6	280	M	50uS	2
245	*****	11177	36	H	2	6,6	6,6	280	M	50uS	2
246	*****	11539	36	H	2	6,6	6,6	280	M	50uS	2
247	*****	11681	36	H	2	6,6	6,6	280	M	50uS	2
248	*****	11681	36	H	2	6,6	6,6	280	M	50uS	2
TDF 19° West											
249	MCM Euro	12034	27	R	3	-	-	-	-	-	-
250	Canal +	11804	27	R	3	-	-	-	-	-	-
251	ARTE	11881	27	R	3	-	-	-	-	-	-
252	Canal Fr	11727	27	R	3	-	-	-	-	-	-
253	*****	11958	27	R	3	-	-	-	-	-	-
254	*****	12034	36	R	2	-	-	-	-	-	-
Intelsat 601 27,5° West											
255	TravelCh	11175	36	H	2	6,65	6,65	200	M	50uS	2
256	Uni.Art.	11052	36	H	2	6,65	6,65	200	M	50uS	2
257	Parl.Ch.	11080	36	H	2	6,65	6,65	200	M	50uS	2
258	CMT Euro	11515	36	V	2	7,02	7,2	130	S	TMSP	5
259	FilmMax	11665	36	H	2	-	-	-	-	-	-
260	FilmNet	11647	36	V	2	7,02	7,2	130	S	TMSP	5
261	BBC WS.	10995	36	V	2	-	-	-	-	-	-
262	SSVC TV	11562	36	V	2	7,02	7,2	130	S	TMSP	5
263	SIS	11591	36	H	2	7,02	7,2	130	S	TMSP	5
264	EBU	11055	36	V	2	6,65	6,65	200	M	50uS	2
265	EBU PVS	11476	36	V	2	6,65	6,65	200	M	50uS	2
266	*****	11155	36	V	2	7,02	7,2	130	S	TMSP	5
267	*****	11135	36	H	2	7,02	7,2	130	S	TMSP	5
Hispasat 1 30° West											
268	TDeporte	12149	36	L	2	6,6	6,6	280	M	50uS	1
269	Classico	12226	36	L	2	6,6	6,6	280	M	50uS	1

Position	Channel name	Video					Audio				
		Transponder freq. (MHz)	Tuner band width (MHz)	Polarisation	Video control	Frequency left (MHz)	Frequency right (MHz)	IF band width (kHz)	Mono/Stereo	Deemphasis	Volume
270	Canal+Es	12303	36	L	2	6,6	6,6	280	M	50uS	1
271	Telesat5	12380	36	L	2	6,6	6,6	280	M	50uS	1
272	Noticias	12456	36	L	2	6,6	6,6	280	M	50uS	1
273	La 2	11649	36	V	2	6,6	6,6	280	M	50uS	1
274	TVE 1	11678	36	V	2	6,6	6,6	280	M	50uS	1
275	Antena 3	12671	36	H	2	6,6	6,6	280	M	50uS	1
276	Canal+Es	12711	36	H	2	6,6	6,6	280	M	50uS	1
277	Tele5 Es	12631	36	V	2	6,6	6,6	280	M	50uS	1
278	*****	11514	36	H	2	6,6	6,6	280	M	50uS	1
279	*****	11594	36	H	2	6,6	6,6	280	M	50uS	1
280	*****	11661	36	H	2	6,6	6,6	280	M	50uS	1
281	*****	12540	36	H	2	6,6	6,6	280	M	50uS	1
282	*****	12591	36	H	2	6,6	6,6	280	M	50uS	1
283	*****	12631	36	H	2	6,6	6,6	280	M	50uS	1
284	*****	11514	36	V	2	6,6	6,6	280	M	50uS	1
285	*****	12544	36	V	2	7,02	7,2	130	S	TMSP	5
286	*****	12591	36	V	2	7,02	7,2	130	S	TMSP	5
287	*****	12671	36	V	2	6,65	6,65	200	M	50uS	2
288	*****	12711	36	V	2	6,65	6,65	200	M	50uS	2
Panamsat 1A											
289	Galavision	11515	36	H	2	6,8	6,8	280	M	50uS	1
290	NHK	11675	36	H	2	6,8	6,8	280	M	50uS	1
291	*****	11596	36	H	2	6,8	6,8	280	M	50uS	1
292	*****	11639	36	H	2	6,8	6,8	280	M	50uS	1
293	*****	11479	36	H	2	6,65	6,65	200	M	50uS	2
294	*****	11560	36	H	2	6,65	6,65	200	M	50uS	2
295	*****	10972	36	H	2	6,65	6,65	200	M	50uS	2
296	*****	10987	36	V	2	6,65	6,65	200	M	50uS	2
297	*****	11006	36	H	2	6,65	6,65	200	M	50uS	2
298	*****	11055	36	H	2	6,65	6,65	200	M	50uS	2
299	*****	12725	36	V	2	7,02	7,2	130	S	TMSP	5
300	*****	12725	36	V	2	7,02	7,2	130	S	TMSP	5

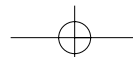


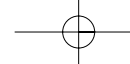


8.2 Radioprogramme

Position	Channel name	Video				Audio					
		Frequency (MHz)	Tuner band-width (MHz)	Polarisation	Video control	Frequency left (MHz)	Frequency right (MHz)	IF band-width (KHz)	Mono/Stereo	Deemphasis	Volume
ASTRA 19,2° East											
1	RadioROPA	11406	27	V	3	7,74	7,92	130	S	TMSP	5
2	STAR*SAT Radio	11406	27	V	3	7,38	7,56	130	S	TMSP	5
3	D. Welle	11229	27	V	3	7,38	7,56	130	S	TMSP	5
4	D.L.F.	11347	27	V	3	7,38	7,56	130	S	TMSP	5
5	DRBerlin	11347	27	V	3	7,74	7,92	130	S	TMSP	5
6	RTL R.	11391	27	H	3	7,38	7,56	130	S	TMSP	5
7	SWF 3	11494	27	H	3	7,38	7,56	130	S	TMSP	5
8	WDR1	11053	27	H	3	7,74	7,92	130	S	TMSP	5
9	WDR 2	11053	27	H	3	7,38	7,56	130	S	TMSP	5
10	NDR 2	11582	27	H	3	7,38	7,56	130	S	TMSP	5
11	NDR 4	11582	27	H	3	7,74	7,92	130	S	TMSP	5
12	N-Joy R.	11464	27	H	3	7,38	7,56	130	S	TMSP	5
13	MDR Spud	11112	27	H	3	7,38	7,56	130	S	TMSP	5
14	Virgin	11377	27	V	3	7,38	7,56	130	S	TMSP	5
15	BBC 1	10979	27	V	3	7,38	7,56	130	S	TMSP	5
16	BBC 2	11553	27	H	3	7,74	7,74	130	M	TMSP	5
17	BBC 3	10979	27	V	3	7,74	7,92	130	S	TMSP	5
18	BBC 4	11553	27	H	3	7,56	7,56	130	M	TMSP	5
19	BBC 5	11553	27	H	3	7,92	7,92	130	M	TMSP	5
20	BBC W.S.	11553	27	H	3	7,38	7,38	130	M	TMSP	5
21	D.W.Fr.1	11229	27	V	3	7,74	7,74	130	M	TMSP	5
22	D.W.Fr.2	11229	27	V	3	7,92	7,92	130	M	TMSP	5
23	SRI Mix	11332	27	H	3	7,38	7,38	130	M	TMSP	5
24	SRI Eng.	11332	27	H	3	7,56	7,56	130	M	TMSP	5
25	Schweden	11597	27	V	3	7,74	7,74	130	M	TMSP	5
26	WRN 1	11538	27	V	3	7,38	7,38	130	M	TMSP	5
27	WRN D.	11538	27	V	3	7,74	7,74	130	M	TMSP	5
28	R.Vlaand	10921	27	H	3	7,38	7,38	130	M	TMSP	5
29	RTE R. 1	11538	27	V	3	7,56	7,56	130	M	TMSP	5
30	CNN R.	11627	27	V	3	7,92	7,92	130	M	TMSP	5

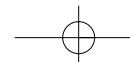
Position	Channel name	Video				Audio					
		Frequency (MHz)	Tuner band-width (MHz)	Polarisation	Video control	Frequency left (MHz)	Frequency right (MHz)	IF band-width (KHz)	Mono/Stereo	Deemphasis	Volume
31	R. Eviva	11332	27	H	3	7,74	7,74	130	M	TMSP	5
32	Ir.Sat R	11538	27	V	3	7,92	7,92	130	M	TMSP	5
33	RTL Rock	11391	27	H	3	7,74	7,92	130	S	TMSP	5
34	SKY R.	11318	27	V	3	7,38	7,56	130	S	TMSP	5
35	Radio538	11318	27	V	3	7,74	7,92	130	S	TMSP	5
36	HitR.Hol	10936	27	V	3	7,56	7,56	130	M	TMSP	5
37	R.S.Gold	11171	27	H	3	7,38	7,38	130	M	TMSP	5
38	ASDA-FM1	11171	27	H	3	7,56	7,56	130	M	TMSP	5
39	RMF FM	11421	27	H	3	7,74	7,92	130	S	TMSP	5
40	UCB	11509	27	V	3	7,56	7,56	130	M	TMSP	5
41	ERF/TWR	11038	27	V	3	7,38	7,38	130	M	TMSP	5
42	SunriseR.	11479	27	V	3	7,38	7,38	130	M	TMSP	5
43	IC R. 1	11288	27	V	3	7,74	7,74	130	M	TMSP	5
44	IC R. 2	11288	27	V	3	7,92	7,92	130	M	TMSP	5
45	IC R. 3	11288	27	V	3	8,15	8,15	130	M	TMSP	5
46	IC R. 4	11288	27	V	3	8,24	8,24	130	M	TMSP	5
47	IC R. 5	11288	27	V	3	8,35	8,35	130	M	TMSP	5
48	IC R. 6	11288	27	V	3	8,48	8,48	130	M	TMSP	5
49	*****	11112	27	H	3	7,38	7,56	130	S	TMSP	5
50	*****	11126	27	V	3	7,38	7,56	130	S	TMSP	5
51	*****	11141	27	H	3	7,38	7,56	130	S	TMSP	5
52	*****	11156	27	V	3	7,38	7,56	130	S	TMSP	5
53	*****	11171	27	H	3	7,38	7,56	130	S	TMSP	5
54	*****	11186	27	V	3	7,38	7,56	130	S	TMSP	5
55	*****	10714	27	H	3	7,38	7,56	130	S	TMSP	5
56	*****	10729	27	V	3	7,38	7,56	130	S	TMSP	5
57	*****	10744	27	H	3	7,38	7,56	130	S	TMSP	5
58	*****	10758	27	V	3	7,38	7,56	130	S	TMSP	5
59	*****	10773	27	H	3	7,38	7,56	130	S	TMSP	5
Intelsat 602 63° East											
60	IRIB R.1	11002	36	V	3	5,95	5,95	130	M	TMSP	5
61	V.O.IRIB	11155	36	V	3	5,8	6,2	130	S	TMSP	5
62	*****	11095	36	H	3	5,95	5,95	130	M	TMSP	5

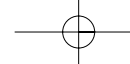




Position	Channel name	Video				Audio					
		Frequency (MHz)	Tuner band width (MHz)	Polarisation	Video control	Frequency left (MHz)	Frequency right (MHz)	IF band width (kHz)	Mono/Stereo	Deemphasis	Volume
63	*****	10906	36	V	3	5,95	5,95	130	M	TMSP	5
Intelsat 604 60° East											
64	TRT Radio Haber	10992	36	H	3	8,28	8,28	130	M	TMSP	5
65	R.DenDic	11136	36	H	3	8,28	8,28	130	M	TMSP	5
66	H.R.-VoT	11650	36	H	3	8,28	8,28	130	M	TMSP	5
67	TRT R.Di	11685	36	H	3	7,5	7,5	130	M	TMSP	5
68	H.R.-VoT	11685	36	H	3	8,28	8,28	130	M	TMSP	5
Türksat 1B 42° East											
69	R.Kuluuep	11080	36	H	3	7,02	7,02	130	M	TMSP	5
70	R.Kuluuep	11080	36	H	3	7,56	7,56	130	M	TMSP	5
DSF Kopernikus 2 28,5° East											
71	Niedersachsen	12725	36	V	3	6,65	6,65	200	M	50uS	2
72	Nord Live	12625	36	H	3	6,65	6,65	200	M	50uS	2
73	*****	12625	36	H	3	6,65	6,65	200	M	50uS	2
74	*****	12625	36	H	3	6,65	6,65	200	M	50uS	2
DSF Kopernikus 1 23,5° East											
75	Rad.ROPA	11475	36	H	3	7,74	7,92	130	S	TMSP	5
76	D L F	11600	36	H	3	7,74	7,92	130	S	TMSP	5
77	STAR*SAT Radio	11475	36	H	3	7,38	7,56	130	S	TMSP	5
78	RTL R.	11675	36	H	3	7,02	7,2	130	S	TMSP	5
79	KlassicR	12591	36	H	3	7,38	7,56	130	S	TMSP	5
80	Melodie	12559	36	H	3	7,02	7,2	130	S	TMSP	5
81	D.R.BER.	11600	36	V	3	7,38	7,56	130	S	TMSP	5
82	JAM FM.	11549	36	V	3	7,38	7,56	130	S	TMSP	5
83	Po.S.	11525	36	V	3	7,38	7,38	130	M	TMSP	5
84	Po.S.	11525	36	V	3	7,56	7,56	130	M	TMSP	5
85	Po.S.	11525	36	V	3	7,74	7,74	130	M	TMSP	5
86	Buchm.Infos	11675	36	V	3	7,74	7,74	130	M	TMSP	5
87	*****	11675	36	V	3	6,65	6,65	200	M	50uS	2
88	*****	11675	36	V	3	6,65	6,65	200	M	50uS	2

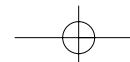
Position	Channel name	Video				Audio					
		Frequency (MHz)	Tuner band width (MHz)	Polarisation	Video control	Frequency left (MHz)	Frequency right (MHz)	IF band width (kHz)	Mono/Stereo	Deemphasis	Volume
Eutelsat II-F3 16° East											
89	RTM (AB)	10972	36	V	3	7,02	7,02	130	M	TMSP	5
90	RTM(Ber)	10972	36	V	3	7,56	7,56	130	M	TMSP	5
91	ERTU M.E	11178	36	V	3	7,2	7,2	130	M	TMSP	5
92	ERTU(AB)	11178	36	V	3	7,38	7,38	130	M	TMSP	5
93	TRGT FM	11095	36	V	3	7,38	7,38	130	M	TMSP	5
94	RTT Inte	11659	36	V	3	7,02	7,02	130	M	TMSP	5
95	V.o.Arab	11178	36	V	3	7,02	7,02	130	M	TMSP	5
96	RTT Arab	11659	36	V	3	7,2	7,2	130	M	TMSP	5
97	Hrvatska	10987	36	H	3	7,02	7,02	130	M	TMSP	5
98	Polskie	111081	36	H	3	7,38	7,56	130	S	TMSP	5
99	Polskie	311081	36	H	3	7,74	7,92	130	S	TMSP	5
100	Polskie	411081	36	H	3	8,1	8,1	130	M	TMSP	5
101	Polskie	511081	36	H	3	8,28	8,28	130	M	TMSP	5
102	Radio	111678	36	H	3	7,02	7,02	130	M	TMSP	5
103	Radio	211678	36	H	3	7,2	7,2	130	M	TMSP	5
104	LaChaine	11678	36	V	3	7,38	7,38	130	M	TMSP	5
105	*****	10972	36	V	3	6,65	6,65	200	M	50uS	2
106	*****	10972	36	V	3	6,65	6,65	200	M	50uS	2
Hotbird und Eutelsat II-F1 13° East											
107	D W. dt.	11163	36	V	3	7,02	7,2	130	S	TMSP	5
108	D W. E2	11163	36	V	3	7,74	7,74	130	M	TMSP	5
109	D W. E3	11163	36	V	3	7,92	7,92	130	M	TMSP	5
110	D W. Asi	11163	36	V	3	8,28	8,28	130	M	TMSP	5
111	D W. Afr	11163	36	V	3	8,46	8,46	130	M	TMSP	5
112	R.Fr.Int	11080	36	V	3	7,38	7,38	130	M	TMSP	5
113	R.FR.Inf	11080	36	V	3	7,2	7,2	130	M	TMSP	5
114	Fr. Cult	11080	36	V	3	7,56	7,56	130	M	TMSP	5
115	SRI Fr.	11080	36	V	3	7,74	7,74	130	M	TMSP	5
116	VoA Euro	11163	36	V	3	7,38	7,56	130	S	TMSP	5
117	RFE Pol.	11095	36	H	3	8,1	8,1	130	M	TMSP	5
118	R.MBC FM	11554	36	H	3	7,38	7,56	130	S	TMSP	5
119	WRN 2	11554	36	H	3	7,74	7,74	130	M	TMSP	5

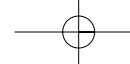




Position	Channel name	Video				Audio					Volume
		Frequency (MHz)	Tuner band-width (MHz)	Polarisation	Video control	Frequency left (MHz)	Frequency right (MHz)	IF band-width (kHz)	Mono/Stereo	Deemphasis	
120	Finnland	11163	36	V	3	8,1	8,1	130	M	TMSP	5
121	*****	11554	36	H	3	7,74	7,74	130	M	TMSP	5
122	*****	11554	36	H	3	7,74	7,74	130	M	TMSP	5
123	*****	11554	36	H	3	7,74	7,74	130	M	TMSP	5
124	*****	11554	36	H	3	7,74	7,74	130	M	TMSP	5
125	*****	11554	36	H	3	7,74	7,74	130	M	TMSP	5
126	*****	11554	36	H	3	7,74	7,74	130	M	TMSP	5
127	*****	11554	36	H	3	7,74	7,74	130	M	TMSP	5
128	*****	11554	36	H	3	7,74	7,74	130	M	TMSP	5
Eutelsat II -F2 10° East											
129	Glass FM	10987	36	H	3	7,02	7,02	130	M	TMSP	5
130	Number 1 FM	10987	36	H	3	7,2	7,2	130	M	TMSP	5
131	Yeni R.	10987	36	H	3	7,38	7,38	130	M	TMSP	5
132	Kiss FM	10987	36	H	3	7,56	7,56	130	M	TMSP	5
133	RNE R. 1	11077	36	H	3	7,38	7,38	130	M	TMSP	5
134	RNE R.Ex	11077	36	H	3	7,56	7,56	130	M	TMSP	5
135	SHOW R.	11575	36	V	3	7,02	7,2	130	S	TMSP	5
136	Best FM	11575	36	V	3	7,38	7,56	130	S	TMSP	5
137	R. Maria	11575	36	V	3	7,74	7,74	130	M	TMSP	5
138	METRO FM	11617	36	V	3	7,02	7,2	130	S	TMSP	5
139	Kral FM	11617	36	V	3	7,38	7,56	130	S	TMSP	5
140	Super FM	11617	36	V	3	8,1	8,28	130	S	J17	0
141	RTP INTE	11617	36	V	3	7,02	7,2	130	S	TMSP	5
142	R.Renac1	11659	36	V	3	7,38	7,56	130	S	TMSP	5
143	R.Renac2	11659	36	V	3	7,74	7,92	130	S	TMSP	5
144	RDP Ante	11659	36	V	3	8,1	8,28	130	S	J17	0
145	R.Comerc	11659	36	V	3	8,46	8,46	130	M	J17	0
146	*****	11659	36	V	3	8,46	8,46	130	M	J17	0
Eutelsat II-F2 7° East											
147	RIK R.3	11144	36	H	3	7,2	7,2	130	M	TMSP	5
148	*****	11010	36	V	3	7,38	7,56	130	S	TMSP	5
149	*****	11144	36	H	3	7,2	7,2	130	M	TMSP	5

Position	Channel name	Video				Audio					Volume
		Frequency (MHz)	Tuner band-width (MHz)	Polarisation	Video control	Frequency left (MHz)	Frequency right (MHz)	IF band-width (kHz)	Mono/Stereo	Deemphasis	
150	*****	11038	36	V	3	7,38	7,56	130	S	TMSP	5
Tele X und Sirius 5° East											
151	Schweden	12475	36	L	3	7,38	7,38	130	M	TMSP	5
152	TT News	12475	36	L	3	7,56	7,56	130	M	TMSP	5
153	TheVoice	12475	36	L	3	7,74	7,92	130	S	TMSP	5
154	*****	12475	36	L	3	7,74	7,92	130	S	TMSP	5
155	*****	11472	36	H	3	7,38	7,56	130	S	TMSP	5
Thor und Intelsat 702 1° West											
156	Nettverk	11016	36	H	3	7,38	7,38	130	M	TMSP	5
157	*****	11016	36	H	3	7,38	7,38	130	M	TMSP	5
158	*****	10906	36	V	3	7,38	7,56	130	S	TMSP	5
Telecom 2B 5° West											
159	Unico	12648	36	V	3	6,4	6,4	130	M	J17	0
160	R.M.C.	12648	36	V	3	6,85	8,2	130	S	J17	0
161	RTL Fr.	12606	36	V	3	6,85	8,2	130	S	J17	0
162	Classiqu	12606	36	V	3	7,75	8,65	130	S	J17	0
163	PalapaFM	12564	36	V	3	6,4	6,4	130	M	J17	0
164	CherieFM	12564	36	V	3	6,85	6,85	130	M	J17	0
165	M 40	12564	36	V	3	7,25	8,2	130	S	J17	0
166	Socielle	12564	36	V	3	7,75	8,65	130	S	J17	0
167	Nostalgie	12606	36	V	3	7,25	7,25	130	M	J17	0
168	Mosquet.	12522	36	V	3	6,4	6,4	130	M	J17	0
169	Europe 1	12522	36	V	3	6,85	8,2	130	S	J17	0
170	NonstopM	12522	36	V	3	7,25	7,25	130	M	J17	0
171	APF R.	12522	36	V	3	7,75	7,75	130	M	J17	0
172	Fourvere	12522	36	V	3	8,65	8,65	130	M	J17	0
174	*****	12522	36	V	3	7,38	7,56	130	S	TMSP	5
Intelsat 601 27,5° West											
175	VirginMR	11175	36	H	3	7,38	7,38	130	M	TMSP	5
176	B.H.S.R	11175	36	H	3	7,74	7,74	130	M	TMSP	5





Position	Channel name	Video					Audio				
		Frequency (MHz)	Tuner band-width (MHz)	Polarisation	Video control	Frequency left (MHz)	Frequency right (MHz)	IF band-width (kHz)	Mono/Stereo	Deemphasis	Volume
177	Texas FM	11175	36	H	3	8,1	8,1	130	M	TMSP	5
178	BFBS 1	11562	36	V	3	7,02	7,02	130	M	TMSP	5
179	BFBS 2	11562	36	V	3	6,12	6,12	130	M	TMSP	5
180	BFBS 3	11562	36	V	3	6,3	6,3	130	M	TMSP	5
181	BBC Ukr.	11562	36	V	3	7,2	7,2	130	M	TMSP	5
182	BBC Euro	11562	36	V	3	7,56	7,56	130	M	TMSP	5
183	BBC WS.B	11562	36	V	3	7,74	7,74	130	M	TMSP	5
184	BBC WS.T	11562	36	V	3	8,1	8,1	130	M	TMSP	5
185	*****	11562	36	V	3	8,1	8,1	130	M	TMSP	5
186	*****	11515	36	V	3	7,38	7,56	130	S	TMSP	5
Hispasat 1 30° West											
187	RNE Radio 2	12149	36	L	3	7,38	7,56	130	S	TMSP	5
188	*****	12631	36	V	3	7,2	7,2	130	M	TMSP	5
189	RNE Radio 3	12226	36	L	3	7,38	7,56	130	S	TMSP	5
190	Cadena 100	12671	36	H	3	7,02	7,2	130	S	TMSP	5
191	Onda Cero Radio	12671	36	H	3	7,38	7,56	130	S	TMSP	5
192	Cad. COPE	12711	36	H	3	7,02	7,02	130	M	TMSP	5
193	Onda c. Musica	12711	36	H	3	7,2	7,38	130	S	TMSP	5
194	Radio Top 40	12711	36	H	3	7,56	7,56	130	M	TMSP	5
195	R.Galicia Ant 3	12631	36	V	3	7,2	7,2	130	M	TMSP	5
196	*****	12631	36	V	3	7,2	7,2	130	M	TMSP	5
197	*****	12631	36	V	3	7,2	7,2	130	M	TMSP	5
PAS 1											
198	Kiss FM	11515	36	H	3	7,4	7,4	130	M	TMSP	5
199	*****	12631	36	V	3	7,2	7,2	130	M	TMSP	5
200	*****	11515	36	H	3	7,4	7,4	130	M	TMSP	5

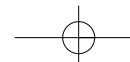
H: Horizontal polarisation
 V: Vertical polarisation
 L: Left-moving polarisation
 R: Right-moving polarisation
 TMSP: TechniSat MultySoundProzessor Chip, deemphasis compatible to Panda/Wegener

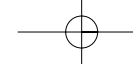
All channels: Decoder internal (no external decoder connected)
 Decoder signal = D4 (video signal)
 Polarity = normal (Ku band)
 22 kHz modulation disabled
 AFC option enabled
 LNB input 1

Pre-programmed skew values

Satellit	Horizontal/11GHz	Horizontal/12 GHz
DFS Kopernikus 2 28,5° East	100	100
DFS Kopernikus 1 23,5° East	75	46
ASTRA	80	-
Eutelsat II F3 16° East	75	-
Hotbird/Eut. II F1 13° East	90	90
Eutelsat II F2 10° East	100	-
Eutelsat II F4 7° East	100	-
5° East	-85 (left-moving)	115 (right-moving)
1° West	100	115 (right-moving)
Telecom 2B 5° West	-	58
Telecom 2A 8° West	-	58
TDF 19° West	126 (right-moving)	-
Intelsat 601 27,5° West	75	-
Hispasat 1A/1B 30° West	53	53
	50 (left-moving)	
PanAmSat 1 45° West	100	-

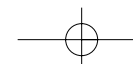
skew value, vertical polarisation for all channels 0

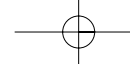




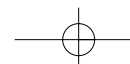
9 Troubleshooting notes

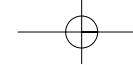
Error	Possible cause	Measures
No picture, no sound, display is off	No supply voltage	check mains cable and connector
No picture, no sound, display is on	cable connection is broken or missing television set is set to the wrong channel wrong outdoor unit selected	check all cable connections (see 4 „Connections“) set channel 39 on the television set (see operating instructions of the TV set) select the right outdoor unit
Screen display „Pulse count error“	cable connection is broken or missing you have reached the East or West limit	check all cable connections (see 4 „Connections“) move dish in reverse direction
Screen display „Motor overload“	The power requirements of the connected motor are too high	Use an appropriate motor
Screen display „Auto-focus error“	Due to a weak receive signal, auto-focus could not detect optimal positioning; receiver uses the stored position	not necessary
Outdoor unit moves in wrong direction	motor connections M1 and M2 exchanged	change motor connections M1 and M2
The automatic satellite scan feature does not find any satellites	automatic scan only works from West to East	first of all, select the westernmost satellite (see 5.4)
The automatic satellite scan feature does not find a number of satellites	Low receive quality Other satellites are using the same broadcasting frequencies	select manually (see 5.4) select manually (see 5.4)
Outdoor unit moves but does not find any satellite positions	wrong outdoor unit selected outdoor unit trajectory adjusted incorrectly polarizer mounted incorrectly	consult a specialist to have the trajectory adjusted correctly mount the polarizer according to the instructions





Error	Possible cause	Measures
Some satellites have good others have a bad receive quality	incorrect skew setting outdoor unit trajectory adjusted incorrectly reflector is too small for the satellite	mount the polarizer according to the instructions and correct the skew parameters (see 7.7) consult a specialist to have the trajectory adjusted correctly use a larger reflector
The channels of a particular satellite have different receive qualities	The channels are broadcast at different power levels	use a larger reflector
Some channels of a particular satellite cannot be received at all	your LNB is not apt to receive at such frequencies	Use a different LNB
Some satellites and channels are missing in the list of satellites or channels, resp.	the satellite positions have not been stored	store the satellite positions (see 5.4 and 5.5)
The receive quality of some satellites has become lower	the outdoor unit has moved	re-adjust the outdoor unit
All satellite channels display "wavy lines"	receiver transmits on a channel which is used for reception via antenna	change transmit channel on the receiver (see 4.2)
A channel that is received via antenna displays "wavy lines"	receiver transmits on a channel which is used for reception via antenna	change transmit channel on the receiver (see 4.2)
The picture is full of black and white points ("little fish")	heavy rain or snow	remove the snow from the outdoor unit
Sound ok., no picture	you have selected a radio channel channel is encoded	switch to TV mode (see 6.5) connect adequate decoder (see 4.5)
Picture ok., no sound	television is set to mute mode receiver set to mute mode or volume to low	check the volume on the television set check the volume on the receiver (see 6.4)
Channel picture or sound disturbed, though working ok. before	audio or video settings have been modified channel is encoded now channel is no longer broadcasting	set up channel again (see 7.7) connect adequate decoder (see 4.4 „Decoder“) no measures
Some channels cannot be selected pressing PROGR	channels has been deleted	select channel (see 7.3)
A connected decoder does not decode	key or SmartCard is not valid wrong SCART connection wrong decoder signal selected	Check the decoder's instructions check the connections (see 4.5) correct the setting (see 7.6)





10 Technical terms

Actuator

Motor with gears and push bars to drive medium to large-sized paraboloidal reflectors

Antenna cable

Cable connection between **modulator** and **satellite receiver** and antenna input of the television set, may be used alternatively when there is no **SCART** connector attached.

Audio bandwidth:

Option that separates two **subcarriers**; it is determined by the broadcasting parameters of each satellite. An excessive audio bandwidth results in an interference between the desired subcarrier and an adjacent subcarrier; a very small bandwidth may lead to distortions.

Outdoor unit:

Term used to describe the entire system which is mounted outdoors. It consists of a **paraboloidal reflector** and one or more LNBs which are used to receive the broadcasts from one or more satellites.

AV

See SCART

Combysat LNB

LNB used to receive the entire **frequency range** between 10.7 and 12.75 GHz. The supply voltage is used to switch from the 11 GHz range (14V) to the DBS/12 GHz range (18V). The **polarizer** toggles between the polarisation levels.

DBS:

Direct Broadcasting Satellite; refers to satellites with a very high broadcasting power in the DBS **frequency range**, e.g. TDF.

Decoder:

Individual device or electronic circuit incorporated in the satellite receiver which is used to decode encoded channels (e.g. Premiere).

Deemphasis:

Adaptation of the audio frequency waveform to the broadcast signalling; determined by the satellite's broadcasting parameters.

Single LNB:

LNB used to receive on one **polarisation level**.

Frequency:

a) Satellite or LNB :	11 GHz range	10.7	to	11.7 GHz
	DBS range	11.7	to	12.5 GHz
	12.5 GHz range	12.5	to	12.75 GHz

b) Receiver: **Intermediate frequency** or **1st I F** 950 to 2050 **MHz**

H/H mount

Motor with gears and integrated support mechanism to drive small to medium-sized **paraboloidal reflectors**.

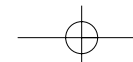
Hz:

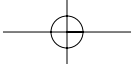
Frequency unit of measurement

1 Hz (Hertz)	= 1	vibrations per second
1 kHz (Kilohertz)	= 1,000	vibrations per second
1 MHz (Megahertz)	= 1,000,000	vibrations per second
1 GHz (Gigahertz)	= 1,000,000,000	vibrations per second

Horizontal polarisation:

See polarisation level





Coax cable:

Cable connection between the **LNB** and **satellite receiver** which is used to transfer the received signals and for the power supply of the LNB.

LNB (Low Noise Block Converter):

Receiving unit centred in the focus of the **paraboloidal reflector**. It converts the **frequency range** of the satellite into the **intermediate frequency** of the receiver.

LOF:

Local Oscillator Frequency; specified in **MHz** or **GHz**, depending on the **LNB** and the received **frequency range**.

Receive frequency of the receiver = Broadcast frequency of satellite - LOF

Correlation between frequency range and LOF:

11 **GHz** range LOF 9.75 or 10 GHz

DBS range LOF 10.75 GHz

12.5 GHz range LOF 10.75 or 11.475 GHz

Modulation at 22 kHz:

Additional control signal, e.g. for an external switching device used to toggle between two **LNBs**.

Modulator

Electronic circuit in the **satellite receiver** or video recorder which is used to connect to a television via **antenna cable**.

Mode:

determines if a channel is received in mono or stereo quality.

Multifeed:

Outdoor unit consisting of a **paraboloidal reflector** and multiple **LNBs** for the reception of multiple satellites.

OSD:

„On-Screen Display“; alphanumeric representation of information on the TV screen

Offset reflector

Special type of paraboloidal reflector which is primarily used for small to medium-sized reflectors.

Paraboloidal reflector:

Reflector of paraboloidal shape made of metal or plastic-coated which is used to focus the electromagnetic waves which are broadcast by a satellite.

Polarisation level:

For an efficient use of the available frequency range satellites broadcast adjacent channels with opposite polarities (alternately horizontal and vertical, or left-moving and right-moving). The reception of both polarisation levels requires two **single LNBs** or a **V/H LNB**.

Polarizer

An equipment which is used to switch the **polarisation levels** by means of an actuator motor drive (mechanical) or through a direct current (ferrite or magnetic). This allows the reception of both polarisation levels over a **single LNB**.

Radio channels:

Apart from the television channels, satellites also broadcast radio channels which are transported on **subcarriers**. In addition to the subcarrier's frequency further parameters have to be set:

Audio bandwidth, Deemphasis, and Mode.

Receiver:

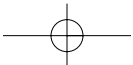
See satellite receiver.

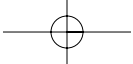
Satellite:

Name and position of the satellite relative to the orbit, e.g.:

Name: Eutelsat Position: 13° East or -13°

Telecom 2B 5° West or +5°





Satellite receiver:

The signals received and converted by the **LNB** cannot be used by the television. The satellite receiver re-processes the signals so that its outputs provide common audio and video signals (**AV**) that can be transferred to the television.

SCART:

Connector on television sets, video cassette recorders, satellite receivers and other consumer electronic equipment used to produce audio and video signals (AV).

Sensor

Produces impulses during a reflector movement that the receiver uses to calculate the reflector position.

Skew

Offset angle of the polarizer. The skew parameter's value is fairly proportional to the angle of the receive signal in degrees.

Timer:

Programmable device that enables the receiver to switch to a desired channel for a defined period of time.

TV:

Television set.

TWIN LNB:

LNB with two outputs that allows independent operation of two satellite receivers (=2V/H LNBs).

Subcarrier:

Carrier frequencies for television sound or radio channels which are broadcast together with the television picture; a stereo channel requires two subcarriers, e.g. 7.38 and 7.56 MHz.

V/H LNB:

LNB which allows the reception of both **polarisation levels** on one or two **frequency ranges**. The **supply voltage** of 14/18V (18V = horizontal level, 14V = vertical level) switches between polarities, the 22 kHz **modulation** toggles between the frequency ranges (off = 11 GHz range, on = DBS range and 12.5 GHz range).

VCR:

Video cassette recorder

Supply voltage:

LNBs are powered via the **coax cable**; in addition, the receiver transfers a voltage of 14 or 18 volts.

Vertical polarisation:

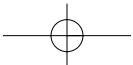
See polarisation level

Intermediate frequency:

The **frequency range** used for satellite broadcasts cannot be transported over cabling systems; this is why the LNB converts these frequencies to an intermediate range between 950 and 2050 MHz. This makes frequency transfer and processing in the **receiver** possible.

1. IF

= Intermediate frequency



11 Specifications

Tuner

Input frequency	950 - 2050 MHz
Input resistance	75 Ω
Input level	47 - 77 dbuV
Connector	F female, 2 pieces
LNB control	
DC	18 V \pm 0.5 V max. 400 mA1) 13.5 V \pm 0.5 V, max. 400 mA1)
AC	22 kHz, 0.5 Vp-p
Bandwidth	27/36 MHz
Tuning	PLL frequency synthesis

TV connection

Output	SCART TV
Video	
Deemphasis	CCIR Rec. 405-1; 625 lines
Bandwidth	5 MHz (3 dB)
Output level	1 Vp-p at 75 Ω , adjustable to 4 levels 1)
Audio	
Frequency range DF	5.4 - 8.7 MHz, adjustable collectively or separately with 180 kHz or 10 kHz increments 1)
Bandwidths	130, 180, 200, and 380 kHz 1)
Deemphases	50 μ s, 75 μ s, J17, Panda1 1)
Frequency range NF	100 Hz ... 14 kHz
Output level	1.7 Vp-p at nominal peak; 1 kHz adjustable to 6 levels 1)
Distortion	typ. 0.5 %, max. 1 % at 1.5 Vp-p, 1 kHz

VCR connection

Output	SCART VCR
Video	see above
Audio	see above
Input signal	
Video	FBAS, 2 Vp-p \pm 2 dB at 1 k Ω

Audio 2 V p-p

Decoder connection

Output	SCART DECODER
Video	adjustable to four modes 1) Baseband, 1 Vp-p with 75 Ω at 1.5 MHz Baseband with deemphasis Baseband with deemphasis and filter with deemphasis, filter and clamping FBAS signal see above
Audio	
Input signal	
Video	FBAS 2 Vp-p \pm 2 dB at 1 k Ω
Audio	2 Vp-p

HF modulator

UHF range	channel 21 to 45 selectable, preset to channel 39
Standard	G
Output level	74 \pm 4 dBuV
Output	IEC male
Input	IEC female
Output resistance	75 Ω

Motor

Permanent power	max. 1.3 A
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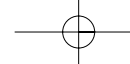
Polarizer

Ferrite	
Output power	\pm 60 mA
Mechanical	
5 V supply	max. 200 mA
Pulse width	0.8 ms - 2.2 ms
Pulse break	15 ms

Power supply

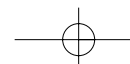
Supply voltage	185 V - 265 V, 50 Hz
Power requirements	max. 70 W
(with 2 LNBS and with running motor)	

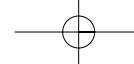
General data



Temperature range	+ 15° C to + 35° C
Humidity	< 80%
Dimensions	43.5 x 6.5 x 27 cm (width x height x depth)
Weight	2.9 kg

1) storable with each channel position





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